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Primary Tumors of the Mediastinum*

• The author discusses the types of tumors of the mediastinum, differential diagnosis, and the means of securing further diagnostic information. He concludes that surgical removal is the treatment of choice whether the tumors are malignant or benign.

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IN this era of startling and dramatic advances in cardiovascular surgery, the attention of physicians interested in thoracic diseases has been diverted, understandably, from the subject of mediastinal tumors. Historically, however, lesions of the mediastinum were among the first intrathoracic abnormalities to be attacked surgically. As early as 1897 an article appeared in the English literature describing the surgical approach to the anterior mediastinum and predicting accurately the later development of this field of surgery.[1] Reference is made to an attempt by the French surgeon, Péan, to remove a mediastinal tumor with the use of a "diving bell" to maintain proper intrathoracic pressure relationships. Prior to this time most mediastinal lesions, if treated surgically, were treated by needle aspiration in the hope of evacuating a mediastinal cyst or of removing the associated effusion.[2]

In subsequent years occasional reports were made of the surgical removal of mediastinal tumors through sternal splitting and thoracoplastic flap incisions. Modern aggressive surgery on the mediastinum had its origin in the 1920's and Harrington's contributions to this field are pre-eminent. In 1929 he reported [3] on 17 cases of intrathoracic tumors in which he had removed the tumors surgically, with one operative death.

Today, of course, little thought is given to the surgical treatment of mediastinal tumors. The risk of the operative procedure is negligible and the presence of an abnormal mediastinal shadow is sufficient in most instances to warrant consideration of surgical removal. Final decision regarding the need for surgical intervention is determined to a great extent by the differentiation of primary cysts and neoplasms of the mediastinum from other mediastinal abnormalities.

Differential Diagnosis

In discussing the various aspects of differential diagnosis, the mediastinum and

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its subdivision should be accurately defined. This knowledge is helpful diagnostically since specific lesions are more apt to occur in certain parts of the mediastinum.

The mediastinum can be subdivided into three main divisions: (1) the anterior mediastinum, which lies anterior to the pericardium and contains loose areolar tissue, lymph nodes, and small blood vessels; (2) the midmediastinum, which contains the pericardium and its contents and other structures within this plane, namely, the superior vena cava, the ascending aorta, the tracheal bifurcation and the pulmonary artery; and (3) the posterior mediastinum, which lies behind the pericardium and contains the descending aorta, the vagus nerves, the esophagus, and the thoracic duct. Because the superior mediastinum may be the site of many of the same lesions that occur at a lower level, it seems unnecessary to make a further division into superior and inferior mediastinum.

Proper distinction between primary mediastinal cysts and neoplasms and metastatic lesions, lymphomas, aneurysms, as well as intrapulmonary lesions, is important. The treatment may vary and the surgical approach may differ from one condition to the next. Unfortunately this distinction is not always easy but there are certain diagnostic methods that may be of considerable help.

A thorough roentgenographic survey, including lateral and oblique views, is of great help not only in localizing the lesion but in determining whether or not the lesion is intrapulmonary or extrapulmonary. Fluoroscopic examination may occasionally be indicated but caution is necessary in the interpretation of visible pulsations since it is hard to differentiate between expansile and transmitted pulsations.

The normal thymic shadow may be a source of diagnostic error in children. It usually begins to decrease in size after the first year of life and by the age of 3 years it usually has disappeared completely. About 2 per cent of children more than 4 years of age will have a thymus that can be recognized as such on the roentgenogram of the thorax. Widening of the mediastinum in children, due to the thymus, may be either unilateral or bilateral. The borders are smooth and the lateral border is generally straight or slightly concave. It does not pulsate except by transmitted pulsation and it does not contain calcium. The normal thymus may project into the right thoracic cavity. A notch between this peninsula of the thymus and the right cardiac border is usually seen. Such a notch, when present, is good evidence that mediastinal widening is due to the thymus and not to enlarged mediastinal nodes.

In adults, bilateral midmediastinal, lobulated lesions may suggest enlargement of the hilar nodes rather than the presence of a primary mediastinal tumor. In such cases biopsy of node-bearing tissue overlying the scalene muscle may be of considerable value. Lymphomas, Boeck's sarcoid and, occasionally, metastatic lesions may be diagnosed in this manner.

Retrograde aortography and angiocardiography are occasionally of help in distinguishing primary mediastinal tumors from other intrathoracic abnormalities, vascular as well as nonvascular. The use of I^{131} in a tracer dose may point, on occasion, to the diagnosis of an intrathoracic thyroid adenoma.

General Considerations

Once the diagnosis of a primary lesion of the mediastinum has been made, a more precise diagnosis is desirable.

Specific lesions occur commonly in certain locations and these are indicated diagrammatically in the figure. Intrathoracic goiters, thymomas, teratomas and vascular tumors are usually located in the anterior mediastinum. In the midmediastinum are located enterogenous cysts, mediastinal granulomas and pericardial cysts. The posterior mediastinum may contain neurogenic tumors, enterogenous anomalies and occasionally an intrathoracic goiter.

The relative frequency of these lesions

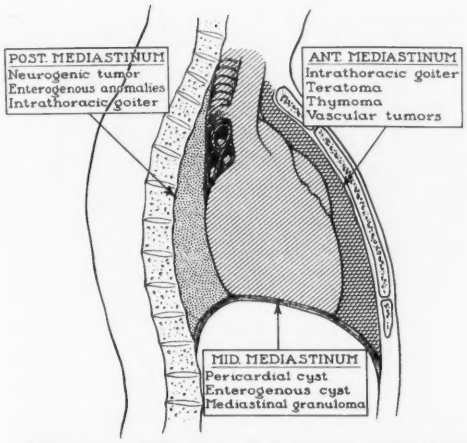

Figure 1. Diagram of divisions of mediastinum and list of lesions contained therein.

is indicated in Table 1. These cases are summarized from recent reports of relatively large series of cases of mediastinal tumors.[4-12] Excluded from consideration are such lesions as lymphomas, metastatic carcinomas and aortic aneurysms.

Neurogenic tumors occurred most commonly and accounted for about 32 per cent of the total tumors. Nineteen per cent of the lesions were teratomatous tumors. Enterogenous cysts occurred in 15 per cent of the patients and thymomas in 9 per cent. Less common lesions are pericardial cysts, undifferentiated malignant neoplasms, and intrathoracic goiters. Of the total group of lesions, 13.7 per cent were malignant. It is interesting that a slightly higher rate of malignant lesions is seen among children.[13] In young patients we have not encountered examples of thymoma, intrathoracic goiter, or pericardial cyst, whereas vascular tumors and cystic hygromas are commoner than in adults (Table 2).

TABLE 2
PERCENTAGE INCIDENCE OF MEDIASTINAL TUMORS

Lesion	Incidence (Per Cent)	
	Adults	Infants and Children
Neurogenic tumors	31.6	32.8
Teratomatous tumors	18.9	27.6
Enterogenous cysts	14.9	17.2
Thymomas	9.2	0
Pericardial cysts	8.0	0
Vascular tumors	Rare	8.6
Cystic hygroma	Rare	6.9
Intrathoracic thyroid	5.1	0
Undifferentiated malignant lesion	4.2	6.9
Miscellaneous	8.1	
Total	100.0	100.0
Malignant lesions	13.7	24

Neurogenic Tumors

As mentioned previously, neurogenic tumors are the commonest mediastinal tumor. They may be divided into two main groups, depending on their origin: those that arise from nerve sheaths, and those that arise from nerve cells. In the thorax they may arise from intercostal nerves,

TABLE 1
PRIMARY TUMORS OF THE MEDIASTINUM: SUMMARY OF NINE REPORTED SERIES[4-12]

Lesion	Benign	Malignant	Total	
			Number	Per Cent
Neurogenic tumors	227	34	261	31.6
Teratomatous tumors	135	21	156	18.9
Enterogenous cysts			123	14.9
Bronchogenic	102			
Esophageal	6			
Gastric	3			
Enteric	2			
Indeterminate	10			
Thymomas	56	20	76	9.2
Pericardial cysts	66		66	8.0
Intrathoracic thyroid	39	3	42	5.1
Undifferentiated carcinoma and sarcoma		35	35	4.2
Miscellaneous	67		67	8.1
Total	713	113 (13.7)	826	100.0

sympathetic nerves or, rarely, the vagus nerve. Tumors of the nerve sheath, generally referred to as schwannomas (neurilemmomas or neurinomas) comprise the largest group and, for the most part, are benign. Nerve cell tumors are made up of benign and malignant growths, the ganglioneuroma representing the former and the neuroblastoma, the latter. Finally, there exists a small group of mediastinal neurogenic tumors, commonly referred to as "neurofibromas" that contain all the nerve elements, namely, axons, sheath cells and connective tissue. A few of the neurofibromas appear grossly as a tangled plexiform mass, and when in this form they are invariably associated with the stigmas of generalized neurofibromatosis. Carey and associates [14] recently reported on 140 cases of neurogenic tumors encountered at the Mayo Clinic. There were 87 nerve-sheath tumors, 44 nerve-cell tumors and nine tumors made up of all nerve elements. Only six of the total group were malignant (Table 3).

Neurogenic tumors characteristically lie in the posterior mediastinum; on lateral roentgenographic views of the thorax they appear to extend to the posterior limits of the intervertebral foramen. Exceptions occur when the lesion arises from nerve tissue other than intercostal or sympathetic nerves, such as the vagus nerve. Tumors of the nerve sheath are grossly spherical, solid, yellowish tumors which may be multiple. Surgical removal is easily accomplished because the lesions are well encapsulated. Occasionally a dumbbell-shaped tumor is encountered, a portion of the growth being located within the spinal canal.

TABLE 3
NEUROGENIC TUMORS

Cell Origin of Tumors		Cases
Nerve sheath		87
Schwannoma		
Benign	86	
Malignant	1	
Nerve cell		44
Ganglioneuroma	39	
Neuroblastoma	5	
All nerve elements		9
Plexiform	5	
Nonplexiform	4	
Total		140

Ganglioneuromas are encountered frequently in children and, in contrast to schwannomas, they are poorly defined on lateral roentgenographic views of the thorax. Posteroanterior views show an elongated, flattened, or triangular density with the broad base toward the mediastinum. Grossly they may be indistinguishable from nerve-sheath tumors but usually they are fairly soft in consistency and possess a glistening, homogeneous, gray or sand-colored surface. They usually are not well encapsulated and frequently adhere to surrounding structures. Surgical removal may be technically difficult.

The malignant neuroblastoma is encountered primarily in children. Thoracic roentgenograms are not diagnostic but occasionally show evidence of multiple areas of calcification within the tumor. Complete removal of the tumor may not be possible. In such cases x-ray therapy may be of value postoperatively and the prognosis may not necessarily be hopeless. Prognosis after surgical removal of benign forms of neurogenic tumors is excellent. Even when such tumors are incompletely removed, recurrence is rare.

Teratomatous Tumors

Teratomatous tumors are found in the thorax, next in frequency to their location in the gonads of males and females. They are congenital lesions and probably arise as an aberration in local somatic development. Pathologically these lesions are composed primarily of dermal elements, in which case they are almost always cystic and are termed "dermoid cysts," or they are characterized by their multidermal origin and are called "teratomas." Teratomas may contain cystic areas but many are solid. Whereas malignancy rarely develops in a dermoid cyst, it is a frequent occurrence in solid teratomas. Coursley [15] recently reviewed the pathologic and clinical data on 74 Mayo Clinic patients operated on during a thirty-three year period for removal of a

teratomatous tumor. Sixty-four of the tumors were benign. Four of them were solid and the rest were typical dermoid cysts. There were 10 teratocarcinomas.

When malignant change does occur, it usually takes place in the glandular epithelium of the lesion, thus leading to an adenocarcinoma which, in most instances, is of high grade. Occasionally the malignant lesion may take the form of a seminoma or embryonal carcinoma similar to tumors seen in the testis.

Teratomatous tumors characteristically are located in the anterior mediastinum. Only rarely has one been encountered which was located in the posterior mediastinum. In thoracic roentgenograms they appear as fairly dense masses, occasionally containing amorphous deposits of calcium. The calcium appears as scattered masses, rather than as diffuse, small densities. The margins of the tumor are sharp and well defined. The tumors may assume large proportions and are potentially dangerous lesions which should be removed surgically. Not only can they grow and become malignant but also they can perforate. When perforation occurs, highly irritating lipoid material from within the lesion may be discharged into the lung and severe pneumonitis develops with a characteristic clinical syndrome. In such cases operation is difficult and it may be necessary to remove a portion of the lung with the lesion.

Enterogenous Anomalies

The next commonest mediastinal lesions are the various enterogenous anomalies. These also are congenital anomalies, and they may assume various forms. They may be spherical or cystic, in which case the term "enterogenous cyst" is appropriate. A further subdivision of this category of enterogenous cysts may be made, depending on the microscopic appearance of the lining of the wall of the cyst. Thus, there may be bronchial cysts, esophageal cysts, gastric cysts, and intestinal cysts.

A second category of such anomalies consists of elongated tubular structures that resemble a portion of the gastrointestinal tract in external appearance. The mucous membrane lining of these anomalies is similar to that of a portion of the alimentary tract, and the anomalies may be separate from, attached to, or communicating with a portion of the alimentary canal. Anomalies of this type have been referred to in the literature as "duplications of the alimentary tract." These lesions are less common and are found oftener among infants and children than among adults.

Enterogenous cysts may produce symptoms of advanced respiratory impairment, particularly in infants and children. Symptoms are due to compression of the tracheobronchial tree, to which these lesions may be attached. They present a constant roentgenographic appearance. They tend to lie in the midmediastinum, particularly in the region of the bifurcation of the trachea. They also may be encountered posteriorly, in the vicinity of the esophagus. They are sharply circumscribed, dense and uniformly oval. The association between enterogenous cysts and anomalies of the vertebral column has occasioned considerable comment in the literature.[16] The association is sufficiently frequent for one to be able to make the correct diagnosis in the majority of patients who have mediastinal lesions and anomalies of the thoracic and cervical vertebrae.

Thymomas

Tumors of the thymus gland comprise a challenging group of mediastinal tumors. They are located in the anterior mediastinum, usually in its upper portion. The term "thymoma" has been applied to neoplasms arising in the thymus gland. Grossly these lesions are lobulated, grayish-pink tumors which frequently may be cystic. Although they are often encapsulated, they may be locally invasive to such an extent as to be technically inoperable. Histologically these tumors may take several forms. There may be a predominance of epithelial elements or of thymocytic elements or there may be a mixture of the two. Another type resembles Hodgkin's disease and has been

referred to as a granulomatous tumor of the thymus.

Histologically no differences can be noted between thymomas that are easily removable and those that are infiltrative. Although these tumors rarely metastasize outside the thorax, they may cause death by local invasion of tissues within the thorax. They should, of course, be removed surgically when possible and treated with roentgen rays if inoperable. Delaney [17] has reviewed the cases of thymoma encountered during a recent five-year period at the clinic. Pertinent aspects of these cases and those reported previously by Seybold and associates [18] are summarized in Table 4.

The association between the thymus gland and myasthenia gravis is not clearly defined as yet. About 16 per cent of patients with myasthenia gravis are found to have a thymic tumor, while nearly two-thirds of the patients with thymomas suffer from myasthenia gravis. Thymectomy, even when a tumor of the thymus is not present, apparently exerts a beneficial effect on the course of the disease in some myasthenic patients. Quite obviously, when a tumor is present, it should be removed surgically regardless of whether or not the patient has myasthenia gravis.

Another unsolved riddle of the thymoma problem is the association of benign thymic tumor and agenesis of erythrocytes. This is a rare condition but the relationship appears to be more than a chance one. Although thymectomy has relieved the anemia in at least two cases reported in the literature, this was not so in two cases recently encountered at the clinic.[19]

Thymomas, as previously mentioned, characteristically are located in the anterior mediastinum, and they may be situated high in the thorax or down near the diaphragm. On rare occasions they may be located posteriorly, or they may even be found within the parenchyma of the lung. Calcification can be seen in about 25 per cent of thymomas by careful roentgenologic study.

The surgical approach to thymomas must depend on the location and size of the tumors. In the case of small, anteriorly placed thymomas, a median sternotomy incision is exceedingly useful. When a large, anterior mediastinal thymoma is present, and particularly one presenting laterally, a posterolateral approach may be better. This incision gives superior exposure and flexibility.

Pericardial Cysts

Thin-walled cysts of the mediastinum filled with a clear fluid and lined with mesothelium are commonly referred to as pericardial cysts. They are located in the midmediastinum, in relation to the pericardium, usually in the inferior portions of the mediastinum. The commonest location is in the cardiophrenic angle of either side, although lesions develop more commonly on the right side than on the left side. Occasionally they may occur at a higher level in the mediastinum.

The constant relationship of these cysts to the pericardium and their frequent location in the cardiophrenic angles suggest an embryologic origin. In the course of development of the pericardium there are found two ventral parietal recesses which end blindly and, under normal circumstances, eventually disappear. These recesses develop at the point where so many pericardial cysts occur. Occasionally there will be a communication between a cyst and the pericardium. The conclusion is inescapable that the various cysts and di-

TABLE 4
THYMOMA

Tumor	Myasthenia Gravis		Total
	Present	Absent	
Encapsulated	36	18	54 (62 per cent)
Invasive	17	16	33 (38 per cent)
Total	53 (61 per cent)	34 (39 per cent)	87

verticula of the pericardium must be related embryologically to persistence of the ventral parietal recess.

These lesions are usually found incidentally on thoracic roentgenograms. They rarely give rise to symptoms. A definitive diagnosis can be made only at thoracotomy. Usually, however, the nature of the lesion can be strongly suspected preoperatively. Its location, rounded or elliptical shape, and uniform density are characteristic. Lateral decubital views may help to demonstrate the cystic nature of the lesion by alteration in the contour of the tumor.

Surgical removal of the lesion is indicated primarily to confirm the diagnosis, since the lesion itself is quite innocuous.

Intrathoracic Goiter

Intrathoracic goiters account for approximately 5 per cent of all mediastinal cysts and neoplasms. Such a lesion can be defined as a goiter in which the whole mass, or the major portion of it, lies within the confines of the thorax.

Grossly, intrathoracic goiters have an appearance much like that of adenomatous goiters in the neck. The blood supply usually comes from the cervical region. In addition, the lesions are frequently covered by a plexus of small veins, just as is the same lesion in the neck. Histologically, they usually are typically benign thyroid adenomas, although occasionally histologic evidence of a malignant lesion is encountered.

They are located most commonly in the anterior portion of the superior mediastinum. It has recently been emphasized that a certain proportion of intrathoracic goiters actually may be situated in the posterior mediastinum, bounded anteriorly by the superior vena cava, posteriorly by the thoracic vertebrae and inferiorly by the azygos vein.[20]

The diagnosis of an intrathoracic thyroid gland is not always easy. Certain clinical features are, however, of considerable value. A patient with a palpable goiter in the neck, or one who previously has undergone thyroidectomy and whose thoracic roentgenogram shows a superior mediastinal mass which moves on swallowing and contains calcium, should be suspected of having an intrathoracic goiter. Occasionally, patients will be encountered who have an intrathoracic goiter but in whom no thyroid gland is palpable in the neck and who have not undergone thyroidectomy. Reference has already been made to the use of I^{131} as a tracer substance in diagnosis. Certain intrathoracic goiters will pick up traces of this isotope in sufficient quantity to allow their identification as such.

These lesions, of course, should be removed. They tend to enlarge, and may encroach on neighboring vital structures. They may become hyperactive and, of course, malignant disease is an ever-present threat.

There are several surgical approaches to these lesions. When there is a sizable cervical component to the lesion, a cervical collar incision usually suffices for adequate removal. If the thoracic component is large and anteriorly placed, the exposure may be facilitated by adding a sternum-splitting incision to the collar incision. In the absence of any cervical component to the lesion, or when thyroidectomy has been performed previously, a posterolateral incision is preferable, particularly if the lesion is posteriorly placed.

Summary

The recognition and surgical management of primary tumors of the mediastinum remain problems of concern to physicians interested in thoracic diseases. Proper distinction between primary mediastinal cysts and neoplasms and other intrathoracic lesions can usually be made by a thorough roentgenographic survey of the thorax. The use of fluoroscopy, aortography, angiocardiography, scalene node biopsy and I^{131} in a tracer dose occasionally may be required for additional diagnostic information.

Neurogenic tumors are the commonest mediastinal tumors and account for approximately a third of all lesions seen in a large series of cases. Teratomatous tu-

mors make up about 20 per cent of the total group, while enterogenous cysts and thymomas occur next in frequency. Less common lesions are pericardial cysts, undifferentiated malignant neoplasms and intrathoracic goiter. Approximately 14 per cent of mediastinal tumors are malignant, although the incidence is slightly higher when only children are considered.

Surgical removal is the treatment of choice for all mediastinal tumors, not only for accurate identification of the nature of the lesion but also for prevention of the complications of continued growth and, when the tumor is malignant, of local and distant spread.

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Tetanus in 1848

During the last two or three weeks, the deaths from tetanus and trismus have greatly increased, and we hear of these diseases in almost every part of the city and in the hospitals, both private and public. The slightest wound, especially in the foot or hand is likely to be followed by tetanic symptoms. This is not the place to speak of this formidable and usually intractable disease; but we may remark that chloroform will relieve if it does not check those violent clonic and tonic spasms, which so speedily exhaust the poor patients; we speak advisedly on this point, and recommend it to the profession, as at least useful in checking the more violent symptoms of the disease, until the usual remedies can be brought to bear on the case.

New Orleans M. & S. J.: 5:398 (August) 1848.

The Use of Anticoagulant Drugs in Atherosclerotic Coronary Artery Disease*

• The author discusses the problem of indications and contraindications for the use of the anticoagulants and the wide divergence of opinion on the subject.

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THE object of this paper is to discuss some of the controversial points surrounding the use of anticoagulant drugs in the prevention and treatment of complications of coronary atherosclerosis and to discuss the clinical use of these drugs. The controversy surrounding their use is primarily statistical and with the extensive work being done in determining the cause of atherosclerosis, the physiochemical forces predisposing to thrombosis, and the effect of lytic agents on fresh thrombi, this statistical controversy may well extend beyond the clinical usefulness of these drugs. There is, however, a growing tendency to accept their use in some, if not all, cases of coronary thrombosis or impending thrombosis.

If the process of coronary occlusion were one of an atherosclerotic lesion with a superimposed thrombus, then anticoagulant therapy would be more universally acceptable. However, Paterson [1] has shown that intimal hemorrhage can be demonstrated at the site of precipitation of a coronary thrombus in 89 per cent of the autopsy cases. Therefore, if hemorrhage occurring into an atherosclerotic plaque were the primary lesion, then certainly the addition of drugs which might increase bleeding at this site would seem contraindicated. Paterson showed by serial sections that these intimal hemorrhages in the coronary arteries are due to rupture of capillaries derived from the lumen of coronary arteries. These capillaries are not related to the vasa vasorum although they do anastomose with these structures in some cases. These intimal capillaries are not normal structures; they are found only in sclerotic arteries, and they apparently develop in response to the demand for nutrition by atherosclerotic plaques in which they ramify. Paterson feels that the sequence of events may well be a basic atherosclerotic lesion, hemorrhage into this lesion from these abnormal intimal capillaries, liberation of thromboplastic substances, and finally intraluminal thrombosis. He states that in 13 per cent of a series of cases of coronary occlusion studied by serial section of the coronary arteries, hemorrhage into atherosclerotic plaques had attained such a size that the coronary lumen was obstructed by pressure alone and sudden death from coronary insufficiency resulted. If 13 per cent of the coronary occlusions are due solely to intimal hemorrhage and pressure occlusion of the coronary lumen, then the risk of additional hemorrhage by the use of anticoagulant drugs would be too great.

Barker [2] of the Mayo Clinic has presented evidence which indicates that although atherosclerosis is the basic disease, final arterial occlusion by thrombosis is responsible for 80 per cent of the transmural myocardial infarctions and that thrombosis develops as a result of one or more of the following factors: Endothelial disease or injury, relative stasis or impairment of regional blood flow, and increased coagulability of blood. He further states that one well con-

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trolled study of experimental thrombosis in the arteries of animals indicated that lysis of thrombi and restoration of the lumen of the arteries was much more rapid and more nearly complete when anticoagulants were given soon after the thrombi were produced than when they were not so given.

Theoretically then, there are at least three mechanisms of death which are preventable by means of anticoagulants: The extension of existing thrombi, the development of new thrombi at other sites, and the formation of a mural thrombus over the infarcted area on the inside of the heart with the subsequent production of embolic accidents. The consensus of opinion is: (1) Subintimal hemorrhages are relatively common. (2) The 13 per cent of coronary occlusion caused by intimal hemorrhage alone in Paterson's group of cases is much higher than the incidence reported by most investigators. (3) The prevention of thrombus extension or new thrombi effectively reduces the morbidity and the mortality associated with coronary atherosclerosis and, therefore, anticoagulant treatment if safe would be a helpful adjunct in the management of these cases.

Anticoagulants in Acute Myocardial Infarction

Wright [3] first reported the use of Dicumarol in acute myocardial infarction in 1945. The report of the Committee for the Evaluation of Anticoagulants in the Treatment of Coronary Thrombosis with Myocardial Infarction, in 1948,[4] increased the enthusiasm in their use.

In this study 368 patients admitted on even days received conventional therapy and constituted the control group. Four hundred and thirty-two patients admitted on the odd days received anticoagulants in addition to conventional therapy and constituted the treated group. Twenty-four per cent of the control patients died; whereas 15 per cent of the treated patients died. The greatest benefit in the reduction of mortality was in the patient 60 years of age and older. Twenty-five per cent of the control patients developed thrombo-embolic complications; whereas only 6 per cent of the treated group developed thrombo-embolic complications while under adequate anticoagulant therapy. Bleeding occurred in 6 per cent of the control and 12 per cent of the treated. Only one case of bleeding was considered severe. It was concluded by the Committee that anticoagulant therapy was safe and should be used in all cases of coronary thrombosis unless a definite contraindication existed.

Parker and Barker [5] of Mayo Clinic reported on 100 treated and 100 control patients. There was no incidence of serious bleeding. There were 37 vascular complications in the 100 control cases and 5 in the treated patients. Fifteen of the untreated patients developed a second myocardial infarction while 2 of the treated developed a second myocardial infarction. Fourteen of the untreated developed pulmonary emboli and only 1 of the treated. There were 8 cerebral vascular occlusions in the untreated cases and 2 in the treated cases. There were 4 cases of peripheral arterial occlusion in the untreated cases and none in the treated.

Nichol [6] treated 207 patients with anticoagulants for myocardial infarction from June, 1943, to June, 1953. The overall rate was 14.3 per cent, however, the author considered the acute stage to last six weeks instead of the four-week interval as used by most authors. Twenty-two autopsies were obtained and rupture of the ventricles was found in only 3 cases, or 1.3 per cent, which is close to the incidence reported where anticoagulants were not used. Nichol obtained, by a questionnaire, further data from 136 physicians who reported that significant hemorrhage occurred in only 2 per cent of 15,500 patients.

Russek [7] divided his cases into "good risk" and "poor risk" patients and found such a low mortality in the "good risk" patients that he does not consider anticoagulant therapy indicated, since the risk outweighs the benefits of anticoagulant therapy. He considers the patients

to be "poor risk" cases when one or more of the following poor prognostic factors is present during the first twenty-four hours of hospitalization. (1) Evidence of a previous myocardial infarction; (2) intractable pain; (3) extreme degrees or persistence of shock: (4) significant enlargement of the heart; (5) gallop rhythm; (6) congestive failure; (7) atrial fibrillation or flutter, ventricular tachycardia or intraventricular block; and (8) diabetic acidosis, marked obesity, previous pulmonary embolism, varicosities of the lower extremities, thrombophlebitis, or other states, predisposing to thrombosis.

De Francisco and Wright [8] reported their experiences with 14 patients who fulfilled Russek's criteria for "good risk" cases in whom a total of 18 certain and 4 probable thrombo - embolic complications ensued. There were 4 major amputations in 3 patients. They concluded that one could not predict with any degree of certainty the probable course of events in an individual who has suffered a myocardial infarction.

Schnur [9] vigorously attacked the statistical validity of the report of the Committe on Anticoagulants and in addition stated that although the Committee recommended that anticoagulant therapy should be used in all cases of coronary thrombosis with myocardial infarction unless a definite contraindication existed, 3 of the responsible investigators on the Committee stated that they did not use anticoagulants routinely in their own practice; 9 followed the recommendations of the Committee, and 1 did not practice clinical medicine.

Autopsy material has also been used to refute the concept of the beneficial effect of anticoagulant therapy. Lee and O'Neal [10] reported findings on autopsy of 174 patients who died of acute myocardial infarctions from 1910 to 1945, which was before the use of anticoagulants, and 326 autopsied patients with acute myocardial infarction subsequent to 1945. Of the 326 patients who were studied subsequent to 1945, 108 had received anticoagulants and 218 had not. The incidence of thrombi was approximately the same in patients with and without the use of anticoagulants. There was no difference between the incidence in those who received adequate therapy and those who received inadequate therapy. However, no thrombi were demonstrated in 28 of the 54 adequately treated patients in whom anticoagulant therapy was started within three days of the clinical onset of myocardial infarction. Myocardial rupture occurred five times more frequently among the anticoagulant treated patients as among the untreated patients in the same period.

Long-Term Anticoagulant Therapy

Following the reports of the beneficial effects of anticoagulant drugs in acute myocardial infarction, investigations were begun to study their effects upon the prevention of recurrent infarction by the long-term use of anticoagulant drugs. The present tendency is to accept the long-term use of anticoagulant drugs following recurrent myocardial infarctions and following severe or complicated initial myocardial infarctions, but there is considerable divergence of opinion regarding their continuous use following mild single infarctions. Keyes, Drake and Smith [11] of Henry Ford Hospital reported their results in patients followed from six months to five years. In the group with a single infarction the death rate was three times greater in the patients who had not received prolonged anticoagulant therapy. In the group with recurrent infarcts, at the end of four years, 62.5 per cent of the untreated were dead versus 12 per cent of those treated with anticoagulants. For the two years prior to 1956 the incidence of bleeding was under 5 per cent.

Suzman, Ruskin and Goldberg [12] have reported on 82 patients receiving anticoagulant therapy continuously for periods ranging from three to seventy-six months, and 88 patients who received anticoagulant therapy only for a period of time limited to the acute phase of the presenting attack or subsequent attacks of myocardial infarction. The mortality rate in the long-term therapy group was

7.3 per cent with 7 recurrences of myocardial infarction; whereas in the short-term anticoagulant group the mortality rate was 33 per cent and there were 24 recurrences.

Separate comparisons were made of the mild and severe cases, and when the mild cases were eliminated the mortality rate in the long-term group (67 patients) was 9 per cent with 7 recurrences of infarction; whereas in the short-term group (60 patients) it was 46.7 per cent with 21 recurrent infarctions. Of the severe cases with a history of previous infarction, the mortality rate in the long-term group (21 cases) was 14.3 per cent compared with 66.6 per cent for the short-term group (15 cases). During the course of the study, cardiac failure occurred with equal frequency in both groups, but the mortality associated with this complication was 11.8 per cent in the long-term group compared with 57.1 per cent in the short-term group. The authors concluded that in patients in whom the presenting attack was mild in addition to being the first one and who received short-term anticoagulant therapy, the outlook was favorable in respect to subsequent infarction, cardiac failure, and death, irrespective of whether or not anticoagulant therapy was continued indefinitely. By contrast, the patients most likely to receive benefit from the long-term anticoagulant therapy were those in whom presenting attacks were severe or there was a history of previous myocardial infarction. As yet, no one knows when long-term therapy should be discontinued.

Coronary Insuficiency with Angina

Studies on the effects of anticoagulants upon coronary insufficiency and angina secondary to atherosclerosis have not been as extensive as the studies in coronary thrombosis and the reports are very conflicting.

Gofman and his co-workers [13] noted unexpected clinical improvement in patients with angina pectoris following the injection of heparin.

Alice Grüner [14] reported results in 24 patients with typical angina pectoris. The patients were treated as outpatients and were given two intravenous injections weekly. During the first two to four weeks placebo injections were given and this was followed by 100 mg. of heparin twice weekly for periods from seven to eleven weeks. Finally placebo injections were again given for three weeks. Fifteen of 27 patients improved during the period of treatment; however, 9 of these improved during placebo injections, whereas only 6 reported improvement during the treatment with heparin. No typical objective changes in the electrocardiogram, blood pressure, or ophthalmoscopic findings could be detected which might suggest a beneficial effect of heparin.

Rinzler [15] evaluated heparin in effort angina by the double blind technique in 18 patients with sclerosis of the coronary arteries and angina of effort. Heparin had no greater effect than a placebo in the control of effort angina. Russek [16] also found no relief of angina by the administration of heparin.

The beneficial effects of Dicumarol long-term therapy in angina pectoris have been reported primarily from the European countries; however, Gabrielsen and his co-workers [17] followed 10 individuals over a period of more than two years and alternated Dicumarol and placebo therapy. The results did not indicate that Dicumarol treatment had a greater effect than placebo treatment in cases of angina pectoris of more than one year's duration.

Anticoagulant Drugs

At the present time two principal types of anticoagulants are in clinical use. These are heparin and the coumarin derivatives and coumarin-like drugs. Heparin acts as an antagonist to thromboplastin from the platelets, and by interaction with the labile factor it interferes with the conversion of prothrombin to thrombin. It also appears to be antithrombic in slowing the rate of interaction of thrombin and fibrinogen. Part of its activity seems to be based on its

high molecular weight and its strong electrical charge. Protamine neutralizes the electrical charge of heparin and counteracts its action. It has the advantage of being rapidly active, its effect being noted in a few minutes if given intravenously. Its disadvantage is that it has to be given parenterally. Because of this disadvantage it is used frequently in the early stages of infarction; however, it is discontinued once one of the oral anticoagulants has produced a therapeutic level. Newer preparations with concentrations of 100 to 200 mg. of heparin per cc. are now marketed and can be used with much less discomfort to the patient.

The coumarin derivatives and coumarin-like drugs decrease the activity of factor VII, and subsequently, the activity of the prothrombin. The activity of other clotting factors, such as plasma thromboplastin component and factor X, decrease during therapy. Dicumarol also decreases the adhesiveness of platelets and reduces platelet agglutinability.[18] The most commonly used drugs of this type are Dicumarol, Tromexan and Coumadin and the phenendione drugs, Danilone, Hedulin and Indon. These phenendione drugs are unrelated to the coumarin derivatives, but their action is similar. There are numerous claims of superiority of one of these derivatives over the others; however, Barker [2] feels that there are few differences between these drugs, and results depend upon the proficiency of the physician in the use of any of them. Therapeutic levels are usually attained when the prothrombin time is two to two and one-half times the control level or approximately twenty to thirty-five seconds. It is usually possible to bring about a therapeutic level within twenty-four to forty-eight hours. These drugs have been given continuously over a period of years in selected patients with good control and results reported. They have the advantage of oral administration; however, daily prothrombins have to be done during the initial phase of their therapy until stability is achieved. Then they must be done once or twice weekly for about six weeks, and if long-term therapy is to be used, prothrombin determination should be done every two weeks. However, monthly determinations are adequate in some cases.

Contraindications to anticoagulant therapy are hypoprothrombinemia due to vitamin K deficiency or severe hepatic disease; renal insufficiency of a marked degree; blood dyscrasias with bleeding tendency; surgery or injuries which leave large, open, raw surfaces; exposure of the brain or spinal cord; ulceration or cancer of the GI or GU tract or other sites at which bleeding may be easily induced; possibly subacute bacterial endocarditis; marked hypertension; and an irresponsible or an incompetent patient. All patients on these drugs should be cautioned about the use of large doses of salicylate while on this therapy since serious bleeding can be produced.

The anticoagulant effect of heparin can be abolished by the administration of protamine, 1 to 4 mg. per kilogram of body weight, intravenously, or fresh blood, and the action of the coumarin or coumarin-like drugs can be counteracted by fresh blood transfusion and by the administration of vitamin K or vitamin K_1 intravenously. Vitamin K_1 is more effective and is usually given in doses of 50 to 100 mg. intravenously. If vitamin K or K_1 is used the anticoagulant effect of the Dicumarol-like drugs is lost. However, there is no evidence that hypercoagulability is produced.[2] It is obvious from the foregoing that there is a wide divergenec of opinion as far as the use of these drugs is concerned; however, the present tendency is to use anticoagulant drugs in the poor risk, if not all patients, with myocardial infarction and in selected cases of so-called "impending infarction." They are of doubtful value in cases of angina.

The Use of Anticoagulant Drugs

If anticoagulants are to be used, it is best to use them early in the course of an infarction. Therapy is frequently begun with heparin either subcutaneously,

intramuscularly, or intravenously. The heparin dosage will vary between 50 to 100 mg. subcutaneously every six hours, and coagulation time done by the Lee-White technique should be done prior to each dose. As a general rule, the coagulation time should be kept within the range of two to three times normal. A number of investigators feel that anticoagulant effect can be obtained by 50 mg. subcutaneously every six hours and that with this dosage it is unnecessary to do coagulation times. Once it has been determined that the patient's prothrombin time is within normal limits and that there are no contraindications to coumarin or phenendione drugs, one of these may be started. These drugs are given orally; however, Coumadin (Wafarin) may be given intravenously or orally. It takes approximately twenty-four to forty-eight hours to get the prathrombin time within a therapeutic range, and heparin administration should be continued until this point is reached. Frequently, particularly in the severely ill patients, heparin therapy is continued over a much longer period of time, often up to two or three weeks, because, first, it is easier to control its effects; and secondly, there is good evidence to indicate that heparin through physiochemical mechanism may have certain advantages over the coumarin derivatives. For example, it acts as a lipemic clearing factor, prevents sludge formation and slowing down of the circulation about the area of infarction, and may have an action on the blood vessels themselves. Long-term use of heparin has been used in coronary artery disease and also in cerebral vascular disease with reported good success.

If one of the coumarin derivatives or coumarin-like drugs are used, the patient should be instructed to watch closely for any evidence of bleeding and should be instructed to have some vitamin K on hand. He should also be instructed to carry identification on his person indicating that he is on anticoagulant drugs and that in case of severe injury, vitamin K_1 or fresh blood transfusion should be administered immediately.

Conclusion

Anticoagulants may be used safely; however, adequate laboratory facilities must be available. Present evidence seems to indicate a beneficial effect of these drugs in the prevention of complications of coronary atherosclerosis. Each physician must decide whether he chooses to use anticoaguants in no cases of infarction, in the poor risk infarction patients, or in all cases of myocardial infarction. In any event, it is important that we recognize that the use of anticoagulant drugs is an adjunct in the total management of these patients and in no way is meant to replace long-established modes of therapy.

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Cranberry Warnings Cause Undue Alarm

The editor of the Journal of the American Medical Association reported that the government's recent pronouncements, reflecting certain scientific data and law pertaining to cranberries, charcoal and chickens, have caused undue alarm among the American people.

In an editorial, entitled "Cranberries, Charcoal and Chickens," Dr. John H. Talbott said that "if turnips and cabbage were included among the vegetables served or mustard was used as a condiment, minute quantities of aminotriazole might have been ingested by the Pilgrims more than 300 years ago."

Aminotriazole was the dangerous, cancer-causing herbicide which caused the government to impound the nation's cranberry supply shortly before Thanksgiving.

"The analyses, began in 1956, were sufficiently satisfactory in detecting residues of aminotriazole that the United States Department of Agriculture reported this compound suitable for use on cranberries," the editorial said, adding: "Eighteen months later, early in November of last year, the implication of this compound as a carcinogen prompted withdrawal of all batched cranberries and cranberry products from the open market."

"Little stress," the editorial continued, "was placed on the well-documented evidence that aminotriazole occurs naturally in vegetables, notably cabbage, turnips and broccoli, as well as in mustard or that the antithyroid action is described in current text books of therapy."

Continuing, the editorial said:

"Charcoal—carbon black—came under scrutiny on November 20, 1959. Since few persons are addicted to the eating of licorice or black jelly beans, there was considerably less space devoted in the newspapers to the suspicion cast on carbon black that had been afforded cranberries. Chronologically, it was recorded in the Federal Registry of December 9, 1958, that carbon black was a permissible food adulterant.

"Chickens (iatrogenic capons) were under suspicion for only a few days last month. However, neither poultry producers, manufacturing chemists, nor the chickens themselves had violated any federal regulation. Approximately 1% of the chickens eaten in the United States have been given stilbestrol as a fattening hormone. Recent improved tests revealed that residues of the drug remained in the skin, liver, and kidneys. After this disclosure immediate steps were taken to withdraw the caponettes from commerce and to suspend the sale of stilbestrol to the chicken growers.

"When next fall rolls around, we hope that cranberries will be permitted for the festive dinners, that licorice and jelly beans will be for sale at the candy counter, and that southern fried chicken will be a permissible menu item."

Current Status of Operations For Occlusive Disease of Peripheral Arteries*

• This article is not only a review of the literature but a comparison of the cumulative results for the various direct surgical procedures for occlusive vascular disease.

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AMONG the remarkable advances made in the field of vascular surgery during the past ten years are those operations directed toward the problem of arteriosclerosis. While these have been utilized for arteriosclerotic occlusion in many sites, we are primarily concerned today with those technics which deal with chronic occlusive disease of arteries distal to the inguinal ligaments, or the femoropopliteal obstructions.

Operations currently available for treatment of peripheral occlusive disease include: (1) thromboendarterectomy, (2) bypass of the occluded artery by graft, (3) replacement of the occluded arterial segment with graft, and (4) lumbar sympathectomy. All of these procedures have had fairly extensive clinical trial and yet a review of the voluminous reports pertaining to them reveals considerable confusion as to the place and efficacy of each in the management of this problem.

The purpose of this paper is to evaluate the first three of these procedures in terms of their advantages, disadvantages, early and late results, and to ascertain their status in our therapeutic armamentarium at the present time.

Selection of Patients

An important part of the evaluation of surgical procedures of this type is a consideration of the selection of patients on whom they will be used. Once a diagnosis of occlusive arterial disease is made, a number of factors influence the decision as to whether a direct surgical procedure is indicated. Some of these are listed in Table 1.

TABLE 1
FACTORS WHICH INFLUENCE SELECTION OF PATIENTS FOR DIRECT ARTERIAL SURGERY

I. EXTENT OF OCCLUSIVE DISEASE
  A. Status of inflow
  B. Status of outflow tract
II. CLINICAL FINDINGS
  A. Age
  B. Symptoms
    1. Claudication
  C. Symptoms and signs of marked ischemia
    1. Rest pain
    2. Cutaneous ulceration, necrosis, or gangrene
III. ASSOCIATED DISEASES
  A. Diabetes
  B. Other manifestations of arteriosclerosis

The extent of the occlusive disease is the most important consideration in determining suitability for a direct surgical approach to the problem. It is agreed that a patient with segmental or localized disease is the best candidate for this type of procedure, yet patients with more extensive disease may also benefit. The two subdivisions under this category are of paramount importance in patient selection. The significance of an adequate flow of blood in the vessels above the obstructed segment is appreciated but its importance has not been emphasized. This factor may be seen in patients with femoral obstruction who also have aortoiliac disease which

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impedes the flow of blood reaching the femoral vessel. Femoral procedures under these circumstances are apt to be disastrous. Creech and his associates [12] have pointed out that late failures following operations are often due to inadequate "run in". The importance of an adequate outflow tract below the obstruction also cannot be overemphasized. The most important prerequisite to a successful result is a patent artery distal to the obstruction which is of sufficient size to allow successful grafting or reconstruction. This is the "sine qua non" of operative criteria and direct procedures are contraindicated if patent distal vessels are absent.

The status of the outflow tract is usually best determined by arteriography and numerous papers [16, 24, 28, 31, 43, 48] have discussed technics, hazards and interpretation. It is well to remember that arteriography is not infallible, especially if there is failure to visualize any distal vessels. It may be advisable in some patients who appear clinically to be favorable candidates, to explore the popliteal artery or to perform distal operative arteriography to determine the true status of the vessel. Distal arteries can be patent, yet be sufficiently diseased to prevent them from giving good run off and a favorable result. The percentage of patients with occlusive arterial disease who have a favorable patent distal arterial tree varies with reports. DeBakey and associates [14] report a patent distal artery in 90 per cent of their patients with occlusive disease who had good circulation at rest and 50 per cent in patients with advanced arterial insufficiency. Wylie and Goldman [48] reported 61 per cent of 199 patients with femoropopliteal occlusion, inoperable by arteriography. Rob [35] reports only 25 per cent of patients with femoropopliteal thrombosis are suitable for reconstruction.

Once the presence of good arterial inflow and a good outflow tract is established, other factors may be considered in patient selection. Age of the patient could be an important determinant but we are concerned primarily with physiologic age and not chronologic age. It is generally agreed that younger patients are better surgical candidates because they are less likely to have diffuse arteriosclerosis. Also many surgeons believe that the prognosis of patients over 65 years is poor because of the likelihood of extensive disease of their small vessels. The consensus seems to be that age in itself is not a contraindication to direct surgery. Surgical series include successful cases up to 84 years of age. One series [14] had 76 per cent of patients over 50 years and many good results over 65 years of age.

The most significant and specific symptom in occlusive arterial disease is intermittent claudication. The patient with segmental occlusion who complains only of claudication might seem to be the ideal candidate for surgery. Yet, most surgeons now agree that the presence of claudication in association with segmental occlusion is not enough in itself to warrant surgical intervention. The severity of the claudication should be the determining factor. Claudication should be incapacitating before it becomes a surgical indication. Cooley [9] picks 200 yards as the distance below which, if severe claudication develops, surgery is indicated. Estes [22] states that patients able to walk two or more blocks without claudication rarely elect operation while those who can walk less usually prefer surgery. A patient's occupation which requires considerable walking influences both the patient and physician toward surgical treatment. The status of progression of the patient's disease as determined by the history of the claudication should be another determining factor. It has been pointed out that all patients are not incapacitated by claudication and that one may have this symptom for years without progression of the disease.[11] If the symptoms are progressive, more aggressive therapy is indicated.

Another question that arises in selecting patients for surgical treatment is which patients with far-advanced disease, whose signs and symptoms are those of severe ischemia, should have attempts at reconstruction or bypass procedures.

Many authors [4, 5, 11, 19] have recorded their pessimism with this group of patients. Cannon [5] recently stated that the presence of actual ischemic lesions in the toes or feet is practically pathognomonic of involvement of the distal tree and operative intervention is rarely indicated. He also stated [6] that if a patient has rest pain and/or gangrene in the foot, amputation is probably the best treatment. Wylie states that no more than 10 per cent of patients with rest pain or gangrene have operable lesions. Although chance for success in this group is diminished, the current practice seems to be to advise and perform surgical procedures if a satisfactory distal arterial bed is present. Most surgeons are willing to risk the increasing number of poor results in this group because the alternative is amputation of the limb. Roberts and Hoffman [36] and LeFevre and associates [27] have shown what may be accomplished by judicious selection of operative candidates with marked ischemia. One is tempted to stretch the indications in this group to those patients with poor outflow because there is little else to offer. The miserable experience of Cannon and his associates [8] with this group of patients shows that operation has nothing to offer if distal vessels are occluded.

The importance of associated diseases in these patients as possible deterrents to direct surgery is controversial. The role of diabetes in patient selection is rather indefinite. There is agreement that arteriosclerosis is usually more generalized in the diabetic patient and that changes are most noticeable in smaller vessels, particularly those of the calf.[15, 26] The fact that patients with occlusive disease and diabetes have poorer survival rates than those without diabetes is also well known.[11, 22] Most reports indicate that the more extensive disease in diabetes makes them poor subjects for direct arterial surgery, and Humphries and his associates [26] have abandoned grafting procedures in diabetics who complain only of claudication. The consensus seems to be that while diabetics are not good candidates for this type of surgical treatment, the most important factor is still an adequate distal arterial segment. In carefully selected cases good results have been obtained in diabetics.[14, 15]

The presence of manifestations of arteriosclerosis involving coronary or cerebral vessels requires careful evaluation in each patient who is a surgical candidate for peripheral occlusive disease. The frequency of associated cardiovascular disease was high in one series [14] where 47 per cent had hypertension and 35 per cent had heart disease. The influence of associated disease is reflected in results reported by Cannon and associates [8] where 37 per cent of their patients with thromboendarterectomy developed major arteriosclerotic complications, 16 per cent of which were fatal myocardial infarction. Wylie and Goldman [48] reported that of their patients with operable femoral occlusion, 47 per cent developed crippling or fatal manifestations of arteriosclerosis at other sites within five years of their initial operation. It has been suggested that such a high frequency of complications due to arteriosclerosis of the cerebral and coronary vessels casts doubt on the wisdom of elective surgery in peripheral arteriosclerosis. DeBakey and his associates,[14] however, do not believe that this factor is important in patient selection and others [26] have urged that this not be a deterring factor. The literature seems to support the contention that each case deserves careful evaluation as to prognosis and life expectancy on the basis of coexisting arteriosclerosis other than that in the extremity.

On the basis of these considerations, the following maxims can be stated in regard to patient selection for direct surgery for arteriosclerosis.

1. The most important single finding for successful treatment is a patent distal arterial tree, and the more normal it is, the better is the chance for a good result from surgery.

2. If intermittent claudication is the chief indication for surgery, it should be disabling and/or progressive. It should be

severe enough to warrant the risk and morbidity of surgery.

3. In patients with severe arterial insufficiency or advanced ischemia, especially when conservative treatment is a failure, additional risk of a direct surgical procedure is justified because the alternative is amputation. Such treatment is not justified if a distal patent segment is absent.

4. Advanced age, diabetes, and manifestations of arteriosclerosis involving coronary and/or cerebral arteries are relative deterrents of varying degrees to direct arterial surgery.

Procedures

There are three surgical procedures which constitute the direct approach to chronic occlusive disease of peripheral arteries. All have had rather extensive clinical trial and are worthy of consideration.

Thromboendarterectomy (Endarterectomy or Thrombointimectomy): This is the procedure by which the occlusion is removed and the artery is reconstructed without use of grafts or synthetic materials. This method depends on the development of a cleavage plane between the atheromatous plaques and the outer portion of the vessel wall. This plane is usually between the intima and media or within the media itself. Early methods of endarterectomy as proposed by Dos Santos were abandoned because of poor results and later the procedure was reintroduced by Wylie [46] for use in the abdominal aorta and iliac arteries. Its use in femoropopliteal obstructions has been championed by Cannon and Barker [7] and the technical details of the procedure are outlined in articles by them [7, 8] and others.[33, 37, 44, 46] These details will not be reviewed here but attention should be called to the fact that early failures were thought to be due to long arteriotomy incisions and these in addition to the long skin incision and tedious dissection prevented this procedure from enjoying popularity. More recently, the innovation of internal stripping by semiclosed methods [7] utilizing multiple short arteriotomy incisions has improved both the technic and, seemingly, the results.

Advantages which have been attributed to thromboendarterectomy include: (1) elimination or diminution of needs for arterial grafts or replacements; (2) leaving of a vessel or conduit of autogenous material; (3) avoiding the problem of kinking, twisting or proper tension of a graft; and (4) the possibility of opening branches within the occluded vessel segment when the atheromatous core is removed. Disadvantages include: (1) a remaining vessel which is thin and may be prone to aneurysmal dilatation; (2) inability to adapt the procedure to some obstructions because of the character of the vessel wall; (3) the problem of management of the intima at the lower end of the dissection; (4) the likelihood of early thrombosis from long arteriotomy incisions or roughened vessel walls; (5) extensive dissection which is usually long and tedious and may destroy collaterals; and (6) the possibility of making the extremity worse if operation fails to restore vessel patency or postoperative thrombosis occurs.

Grafting Procedures: The other two direct procedures employed in surgical treatment for chronic occlusive vascular disease require the utilization of some type of vascular replacement or graft. It is not within the scope of this paper to discuss the advantages and disadvantages of various types of vascular grafts. Suffice it to say that three groups of grafts have been used extensively and these are arterial homografts, venous autografts and synthetic prostheses. Arterial homografts have been largely discarded from use in the lower extremities because of limited availability and a high late failure rate due to atherosclerotic changes and aneurysmal dilatation.[28] After an earlier discouraging trial, venous autografts have again gained popularity in some quarters.[2, 13, 28, 29, 39] There is some evidence that they are less likely to develop late difficulties than other grafts.[28] Many prosthetic grafts have been used but teflon and dacron have generally replaced

others in current use. These are probably the most widely used grafts today because of easy availability and reported early results which were encouraging. These are considered by many to be the best available grafts for replacement of the terminal aorta.

Once the type of graft is selected, it can be used either as replacement for, or as a bypass of, the occluded vessel. **Bypass grafts** are those which are inserted by an end-to-end technic above and below the obstructed arterial segment. It is generally agreed that regardless of the length or site of obstruction, the proximal anastamosis should be in the region of the common femoral artery or above. Those who are interested in the technical details of this procedure are referred to the works of DeBakey and his associates,[14] Edwards,[19] Deterling [15] and others [37, 43] who have amassed considerable experience with its use.

Advantages cited for this procedure by its proponents include: (1) relatively short operative procedure with short incisions and minimal dissection, regardless of the length of obstruction treated; (2) preservation of collateral vessels so patient is no worse if procedure fails immediately; (3) utilization of end-to-side anastomoses which are larger in circumference than others and thus tend to decrease incidence of thrombosis; (4) the leaving of intact vessels which may carry some blood; and (5) the applicability of the procedure in some patients where thromboendarterectomy is impractical. Disadvantages of this procedure are as follows: (1) the use of a foreign material as graft with its inherent disadvantages; (2) the failure to remove the atheromatous material which may allow its encroachment on the anastomosis and lead to early failure; (3) the small range of technical error consistent with successful function; and (4) the possibility of making the extremity worse if late failure of the graft occurs (due to failure of collaterals which have closed).

Some surgeons prefer to remove or excise the occluded segment of artery and replace it with a graft. Others prefer similar grafts but only exclude the obstructed segment, rather than remove it. All these procedures we will group in the category of **Replacement Grafts** for purpose of discussion. The separation of this group from other grafting procedures may be a somewhat artifical one since some surgeons excise and replace short occluded segments while they bypass longer ones and group all the procedures as grafting procedures. The technic for replacement grafting differs from bypass procedures in that a more extensive dissection is required in order to remove the obstructed segment and this, of necessity, destroys numerous collaterals. Also the anastamoses with this type of graft are usually end-to-end. Humphries and his associates [26] have emphasized the importance of replacing long straight arteries in their entirety and not just the diseased segment. They believe that some of the poor results with this procedure are due to limited replacement of short diseased segments.

Wide use of replacement grafts has been reported by numerous authors and the advantages cited include: (1) use of end-to-end vascular anastamoses which are thought by some to be more physiologic; (2) unlikely possibility of progression of disease to occlude anastamoses since entire involved area is excised or excluded; (3) avoidance of long incisions and extensive dissection by excluding long diseased segment and leaving them in place. Disadvantages which have been attributed to these procedures are: (1) those inherent in various types of grafts; (2) the extensive dissection required to excise the entire diseased artery with destruction of collaterals; (3) greater likelihood of thrombosis in end-to-end anastomoses of peripheral vessels because of their small size; and (4) the likelihood that the extremity will be worse than before surgery if graft failure occurs.

Results

To ascertain the effectiveness of these various procedures, reported results have been reviewed for evaluation. This has

been like tabulating election results about thirty minutes after the polls close. The reports are at best fragmentary, inconclusive, and in many instances not comparable, one with another. Nevertheless, they provide the only concrete evidence on which to judge the effectiveness of the procedures.

Table 2 is a tabulation of some of the most recent reported results of thromboendarterectomy for femoropopliteal occlusions. Note that the total number of cases is relatively small and the chance for an immediately successful result (patent peripheral pulses) has ranged from 53 to 90 per cent with an average of 71 per cent. Late results in patients followed about one year, showed patent pulses in 53 to 73 per cent with an average of approximately 65 per cent. Cannon and associates [8] have reported a number of patients who have been followed for a longer period and their most recent report showed that 66 per cent of them had fair to excellent improvement up to 63 months after operation. They also reported an operative mortality of 2.2 per cent for thromboendarterectomy and an amputation rate of 13 per cent. The most encouraging recent report is that of Wylie [47] who states that during the past three years, utilizing the internal stripping method and better case selection, thromboendarterectomy has been almost as satisfactory for femoral lesions as it has been for aortoiliac disease. He further states the immediate thrombosis rate following endarterectomy at all sites has dropped to less than 3 per cent and that of 165 patients with successful operation, only 2 developed late occlusion. This latter group was followed an average period of four years.

Tables 3 and 4 show the recent results reported for procedure utilizing bypass grafts. The first seven series in which the arterial homograft was used reported immediate success in 83 per cent of cases (range 73 to 92 per cent), and a late success rate which averaged 57 per cent (range 39 to 80 per cent). These cases were followed up to thirty-eight months. The next nine series used various prosthetic grafts for bypass. Immediate successful results were noted in approximately 83 per cent of cases (range 60 to 89 per cent) which when followed up to three years, were reduced to 68 per cent (range 17 to 84 per cent) of the total.

Although a number of reports favor venous autograft bypass as the procedure of choice, only one recent detailed report [13] was found and this small series had an immediate success rate of 77 per cent and 58 per cent success in patients followed up to twelve months. Other enthusiastic suporters of venous grafts have commented in regard to superior results obtained but their detailed results were not found during this review. Linton has stated that in his experience no saphenous vein graft which was patent on discharge from the hospital has occluded and the longest follow-up period has been six years. Cooley [10] and his associates have demonstrated the safety of bypass procedures

TABLE 2
RESULTS OF THROMBOENDARTERECTOMY

Source of Material	No. Cases	Immediate Success Per Cent	Late Success Per Cent	Length of Follow-up
Warren [44]	14	85.6	64.3	6 to 14 mo.
Cannon et al [8]	45	71.0	62.0	1 yr.
DeBakey et al [14]	17	53.0		
Freeman and Nicholson [23]	21	90.4	62.0	1 yr.
Warren and Villavicencio [45]	21		55.0	1 yr.
Creech et al [12]	15	73.3	73.3	2 to 18 mo.
Muller [32]	19	52.6	52.6	Up to 1 yr.
Average		70.9	64.9	1 yr.

TABLE 3
RESULTS OF BYPASS PROCEDURES

Source of Material	No. Cases	Type of Graft	Immediate Success Per Cent	Late Success Per Cent	Length of Follow-up
Payne et al [34]	23	Arterial Homograft (A. H.)	74.0		
Deterling [15]	39	A. H.	92.3	80.0	Up to 2 yr.
Luke [30]	56	A. H.	88.0	50.0	Up to 2.5 yr.
DeBakey et al [14]	83	A. H.	85.0	69.9	Up to 38 mo.
Hohf et al [25]	33	A. H.	72.7	39.4	1 to 3 yr.
Linton [28]	38	A. H.		60.0	2 to 3 yr.
Dale et al [13]	37	A. H.	72.9	27.0	Up to 32 mo.
Average			83.0	57.0	Up to 3 yr.

TABLE 4
RESULTS OF BYPASS PROCEDURES

Source of Material	No. Cases	Type of Graft	Immediate Success Per Cent	Late Success Per Cent	Length of Follow-up
Deterling [15]	10	Synthetic Prostheses	60.0	50.0	Up to 1 yr.
Edwards and Lyons [20]	38	Nylon and Teflon	81.5	71.0	Up to 33 mo.
DeBakey et al [14]	110	Nylon	86.0	68.1	Up to 38 mo.
DeBakey et al [14]	137	Dacron	89.0	83.9	Up to 38 mo.
Hohf et al [25]	23	Nylon	73.9	43.5	Up to 2 yr.
Szilagyi et al [42]	50	Dacron	75.0	68.0	18 mo.
Creech et al [12]	26	Nylon	76.9	16.6	9 to 18 mo.
Muller [32]	25	Synthetic Prostheses		68.0	Over 6 mo.
Edwards [18]	All Cases	Nylon and Teflon		50.0	3 yr.
Average			83.3	68.5	Up to 3 yr.
Dale et al [13]	31	Venous Autograft (V. A.)	77.4	58.0	Up to 12 mo.

by reporting an operative mortality of 1.5 per cent.

Table 5 shows results in patients in whom the occluded segments are replaced by vascular grafts. The number of series reported is small because this procedure has become less popular with the increase in popularity for bypass procedures. It should be noted that two of these series contain a number of bypass procedures and might be included in either grafting category. The tabulated series using all graft types had an immediate success rate which averaged 72 per cent (range 50 to 84 per cent) and a late success rate averaging 67 per cent (range 36 to 75 per cent). These patients were followed from eight months to five years. The most encouraging long term results for grafting procedures are those reported by Humphries and associates with 75 per cent success in patients followed four to five years.

Table 6 shows a comparison of the collected results of various procedures reviewed here. It is noteworthy that the immediate success of bypass grafts excels that of the other procedures. With the

TABLE 5
RESULTS OF REPLACEMENT GRAFTS

Source of Material	No. Cases	Type of Graft	Immediate Success Per Cent	Late Success Per Cent	Length of Follow-up
Shaw and Wheelock [38]	22	A. H. & V. A.	72.7	63.7	Up to 8 mo.
Dye et al [17]	30	V. A.	50.0	36.6	2 to 4 yr.
Szilagyi et al [41]	71 *	A. H.	77.5	52.1	Up to 33 mo.
DeBakey et al [14]	19	Synthetic Prostheses	84.0		
Humphries et al [26, 27]	250 †	A. H. and Dacron		75.0	4 to 5 yr.
Average			72.1	66.9	Up to 5 yr.

* Includes 18 bypass grafts.
† Estimate includes indeterminate number of bypass grafts.

TABLE 6
COMPARISON OF RESULTS OF ALL OPERATIONS

Procedure	Immediate Success Per Cent	Late Success Per Cent	Length of Follow-up
Thromboendarterectomy	70.9	64.9	1 yr.
Bypass Grafts	83.0	63.8	Up to 3 yr.
Replacement Grafts	72.1	66.9	Up to 5 yr.

follow-up thus recorded, it is difficult to attach any significance to these late results.

Discussion

A review and comparison of the cumulative results for the various direct surgical procedures for occlusive vascular disease shows no clear superiority of one procedure over another. It seems that greater experience, with a long-term follow-up of each case, is necessary before the true results of these procedures will be known. This review does indicate some trends in the use of these surgical procedures which are worthy of attention.

There is some evidence to support the contention that although bypass grafts give greater early or immediate success, patients with patent pulses following thromboendarterectomy are likely to have better long-term results.[8, 12, 18, 45, 47] This has caused some surgeons [12] who formerly used grafts extensively to relegate them to a place of secondary importance and advocate thromboendarterectomy as the procedure of choice in femoropopliteal occlusion. Others [5, 45, 47] concur in this choice of treatment.

With the continued experience with grafting procedures, replacement grafts have been largely supplanted by bypass grafts. Bypasses utilizing teflon or dacron prostheses continue to be widely used and are the choice of some surgeons [9, 14] as the best of all procedures for occlusive diseases of peripheral arteries. Others [18] who favor endarterectomy for short occlusions favor bypass grafts for patients with more extensive disease. Still other clinicians, discouraged by the long-term results of prosthetic grafts, have revived the interest in venous autograft bypasses and their results are encouraging.[2, 13, 28] Linton [28] and Baffes[1] are among those who believe that this is the best available procedure for femoropopliteal occlusions.

Although additional time and experience are necessary to place these surgical procedures in their proper perspective, it seems that the results from all are definitely inferior to those reported for the same procedures in larger arteries. One also is impressed that the over-all long-term results in femoropopliteal occlusions have been rather disappointing. This is reflected in a diminishing enthusiasm for

the procedures [5, 32, 40] and expressions of increasing conservatism in patient selection. Some surgeons [12, 18, 32] have almost abandoned the procedure for which they originally expressed enthusiasm while others [5, 9, 40] continue to perform the same procedure but have recognized its shortcomings. Few surgeons are able to duplicate either the results or the enthusiasm expressed for the various procedures by DeBakey, Wylie or Humphries.

It has been predicted that improvement in reported results in the near future is more likely to reflect improved patient selection rather than improvement in the procedures themselves. There are indications that the result from this type of surgery will probably not improve materially until some newer type of graft material is obtained which is far superior to available grafts, or more importantly, until some chemical is discovered which will complement the surgical procedure and stop the progression of the disease itself. Whether long-term anticoagulant therapy is of value in preventing thrombosis of the graft or progression of the disease is a moot question but further trial seems indicated.

At the outset, we hoped with this review to ascertain the status of surgical procedures for occlusive vascular disease in peripheral arteries. It seems evident that their exact status is indeterminate at this time due to insufficient cases of the various types which have been followed long enough to allow accurate appraisal of their efficacy. It is hoped that with reports of detailed long-term results that the exact place for use of each of these procedures will become more definite. Unless there is some agreement on classification and nomenclature of this disease, however, which will allow comparable series to be compared, additional experience may only further confuse the problem. This seems a fair assumption when one studies results of sympathectomy in this disease and realizes that we still have not agreed on its exact place in our therapeutic armamentarium.

While awaiting the final answer as to which of the direct surgical procedures offers the most to patients with femoropopliteal occlusions, results of this form of treatment seem to clearly indicate that a continuation of these surgical procedures in certain patients is worthwhile. Patients should be selected carefully and those who appear to have segmental occlusions, who are either incapacitated or in danger of losing their extremity, should be operated on. The best choice of procedure seems to lie between endarterectomy and bypass graft and the surgeon should use the one which in his own experience gives the best results.

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Cholera

Reported by E. D. Fenner, M.D., New Orleans.

I deem a disquisition upon epidemic cholera altogether unnecessary at this time, since so much has been written on the subject; * * * I may be permitted to premise that the epidemic cholera which made its appearance in New Orleans about the 12th of December last, and raged for about one month, has never since been entirely extinguished. From the last of January to the first of March, the disease ceased to attract attention and the city was filled with visitors; but the weekly mortality from cholera, as reported by the Board of Health, never fell below twenty-four deaths. Early in the month of March, the weather having become quite warm, cholera began to increase rapidly, and soon became what I should call a well marked Epidemic. The deaths from it during the week ending the 26th of March having reached two hundred and eighty-five! being more than two thirds of the entire mortality. From that time, it gradually abated again, and at this time, (April 13th) but few cases are seen.

Bagassosis -- A Medical Enigma

• Few cases of bagassosis have been reported in the world literature, yet it constitutes an industrial hazard of more widespread incidence than has been recognized.

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ALTHOUGH more than twenty years have elapsed since the relationship between exposure to bagasse dust and a resulting respiratory illness was first recognized by Blitz and Monte (in 1937),[1-2] many features of the pulmonary disorder, now known as bagassosis, continue to constitute a medical enigma.

Very little more is presently known about this disease than was learned during the first few years after its recognition, and many important questions pertaining to its etiology, pathology, geographical distribution, sequelae and physiology remain unanswered.

Etiology

The exact etiology of bagassosis is still unknown. Although it is clear that the illness results from exposure to bagasse dust, the precise physiopathological mechanism involved remains obscure. The silica content of bagasse, allergy to the fiber or to contained microorganisms, mechanical obstruction, direct toxic or irritant effect of the material, a foreign body reaction and infection by associated bacteria or fungi have all been incriminated without convincing proof.

Pathology

The pathology of bagassosis is poorly understood. Few diseases are associated with a greater dearth of pathological information. The entire world's literature contains mention of only two necropsies and two needle biopsies of the lung.

One autopsy (Hunter and Perry, 1946)[3] was performed four years after the onset of illness on a patient with somewhat questionable, or at least unusual, bagassosis. A microscopic description is not included, but the gross pathological findings indicate the presence of a variety of well recognized morbid changes including extensive bronchiectasis, purulent tracheobronchitis and bronchiolitis, pulmonary emphysema, marked fibrosis and chronic pleuritis.

The other autopsy report(Sodeman & Pullen, 1943),[4] although again incomplete, contains some histological information, the most notable feature being a description of "spicules" (presumably of bagasse fiber) in the pulmonary tissue.

Foreign body "spicules" were also seen in the two needle biopsies of the lung (Sodeman & Pullen, 1943 and 1944),[4-5] which were carried out in another patient. However, similar objects cannot be found in the lungs of experimental animals exposed to bagasse dust.[6-7]

The picture is further complicated by the fact that illness occurs in rabbits only when unsterilized dust is used and is then usually characterized by a hemorrhagic pneumonitis and bronchiolitis, apparently attributable to aspergillosis. Exposure to sterilized bagasse fiber produces only a relatively innocuous foreign body reaction.[6-7]

Obviously, much more study of the pathology of bagassosis is needed if a clearer understanding of this disease is to be evolved.

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Geographical Pattern

The geographical pattern of bagassosis is unexplained. In spite of the enigmatic nature of the above problems, the most puzzling and intriguing feature of bagassosis is its geographical distribution. Until as recently as four years ago, all known instances of the disease resulted from contact with bagasse produced in Louisiana. Cases occurring in Missouri,[8] Texas,[9] and England [3, 10, 11] were exposed to Louisiana bagasse which had been shipped to those areas. Thus Louisiana sugar cane was considered to be the exclusive source of the disease; however, in 1955 this concept was shattered with reports of Ganguly and Pal [12] and Singh [13] describing cases in India. It was then recognized that bagassosis must be a potential hazard wherever sugar cane is grown but why the disease has never been reported from other great cane producing areas of the world—such as Cuba, Puerto Rico, the Philippines, Hawaii, Argentina—remains a great mystery.

The author has reason to believe that bagassosis does occur in at least some of these countries, but once again the failure to recognize or to publicize the illness constitutes an equally baffling aspect of the problem.

Perhaps even more puzzling is the apparent distribution of bagassosis in Louisiana. The earliest cases originated in two sugar factories near the town of Raceland, and as far as can be ascertained, bagasse from these same plants has remained the sole source of the disease. All patients with which the author is familiar contracted the illness either in the two indicated sugar factories or in two manufacturing plants (one near Raceland and one near New Orleans) to which they supply bagasse. Why the other, more than 60, sugar factories in Louisiana have never had a case of the disease remains as deep a mystery at the present time as it was twenty years ago [1] — a mystery, sadly enough, which no one has made a concerted effort to solve.

Sequelae

The sequelae of bagassosis are undetermined. Although there is some indication that bagassosis may be the cause of permanent residual pulmonary fibrosis and diminished respiratory reserve,[1, 3, 10-12, 14] once again adequate follow-up studies have never been carried out, and this vital point remains unsettled. As a result, this disorder is not generally [15-16] classified as a pneumoconiosis, and hence as an industrially compensable illness as it might well deserve to be.[11]

The consequent financial injustice to the many workers who have contracted this disease in the course of their occupation is obvious.

Physiological Data

Physiological data pertaining to the serious derangement of the respiratory mechanism by bagassosis is extremely limited. Diminished vital capacity and maximum breathing capacity are commonly encountered and clearly point to a significant impairment of ventilatory function, while elevation of the serum bicarbonate level in some cases appears to indicate the presence of respiratory acidosis due to alveolar hypoventilation. In addition, the author has studied one patient with an apparently mild recurrence of bagassosis who had little or no ventilatory difficulty but who exhibited a definite disturbance of gas exchange at the alveolar capillary level (unpublished data). It is obvious that much more extensive studies of pulmonary function are necessary to elucidate further the physiological defect in this disease and to determine whether or not bagassosis results in permanent functional disability.

Is Incidence an Industrial Hazard?

The recognition of these many unanswered questions makes it difficult to understand why there has been so little medical or industrial interest in an occupational disease which is associated with important manufacturing processes (paper,

wallboard, plastics, etc.) and which produces serious illness [17] and perhaps significant permanent disability. The obvious explanation of this attitude appears to be contained in the commonly held impression that bagassosis is an an extremely rare medical curiosity of little importance, since only 57 cases,[1-2] including 27 from the United States, 17 from England and 13 from India, have been reported in the entire world's literature. An additional 20 cases are referred to but not described in detail.[1-2] In like manner, the scientific literature would also seem to indicate that the incidence of the disorder has been markedly diminished and that it has virtually ceased to exist, in view of the fact that only 5 cases have been reported in America in the past eight years.[1-9]

Unfortunately, both of these impressions are entirely false.

As pointed out in previous reports,[1-2] bagassosis is undoubtedly much more common than the number of reported cases would seem to indicate, since the vast majority of patients suffering from the milder forms of this disorder either recover spontaneously and do not seek medical attention or in many instances receive an erroneous diagnosis such as "upper respiratory infection," "flu," or "pneumonia." In addition, the author has personal knowledge of a considerable number of patients in whom the correct diagnosis has been established but the cases never reported.[1, 2, 14]

Similarly, the impression that the disease is decreasing in incidence appears to be unfounded. The author has personally seen 2 cases during the past year and was informed by one of these patients that a number of his co-workers had experienced similar illnesses after exposure to bagasse dust. In addition, several of the author's colleagues have seen sporadic cases and another, Dr. Joseph K. Bradford of New Orleans, has studied 20 patients with bagassosis during the past five years.[14] Most of these patients "have been seen on several occasions because of recurrent episodes, and at least a dozen of them have had to return within the past eighteen months." All of these cases came from the same plant, and "it is of interest that this resurgence in recent months coincided with a change in manufacturing technique from a so-called wet process back to the use of dried, old bagasse." [14]

In view of these observations, it appears clear that this disorder is not rare and that it continues to represent a significant industrial hazard. It follows then that the veil of mystery which has surrounded bagassosis for so long must be lifted; that industrial apathy and disinterest must be rectified and that medical knowledge and understanding of this disease must be improved. Its resultant elimination as an occupational menace through the cooperative efforts of all concerned will surely be the reward.

Conclusions

In order to accomplish these ends, the author believes that the medical profession as well as official health agencies must take a more active interest in the study, control, and prevention of bagassosis. A committee or council appointed by appropriate medical groups and charged with the responsibility for the full investigation of this disease, in cooperation with the industries concerned, would be highly desirable. If possible, a well equipped medical center should be designated for the thorough evaluation of all patients with bagassosis, this center to enjoy complete freedom to publish all information pertaining to the disease as they see fit. Through these mechanisms, it would appear that a thorough understanding of this disorder could be brought about and that the occupational hazard involved could be permanently, if belatedly, eliminated.

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Addendum

Since this paper was submitted for publication, a small part of the puzzle concerning the geographical distribution of bagassosis has been resolved by the sudden appearance of the disease in Puerto Rico and by the discovery of a report from Italy (Cangini, 1951) describing 5 cases which resulted from contact with sorghum bagasse. A single case reported from Venezuela (Salfelder, 1956) is probably not authentic.

In late May 1959, a new manufacturing plant, which produces paper from bagasse, began operation in Arecibo, Puerto Rico. Almost at once cases of bagassosis began to appear, and by December 1959, approximately eighty workmen had become ill with this disease. The author has recently returned from Puerto Rico, where he was extended the privilege of interviewing some of these patients, reviewing much of the clinical material and investigating the circumstances of their occupational exposure. There can be no doubt as to the authenticity of the majority of these cases.

The Puerto Rican cases appear to be of particular importance, since they not only comprise the largest and most concentrated outbreak in the history of this disorder — more than equaling the combined reported cases of the world—but serve to verify the contention that bagassosis is a potential danger wherever sugar cane is grown and bagasse is utilized. They further belie the idea that bagassosis is a mere medical curiosity and firmly establish this disease as an industrial hazard of considerable and increasing importance.

Historical Notes

Since the commencement of history, never did a single year include within its orbit so many great, yet incomplete events, affecting the civil and social conditions of society, as that of the past year—events that must long influence for good or evil, the vital progression of the world. The Representative Principle is now extensively arrayed against the Monarchical, the Sovereighty of People against the Sovereignty of Kings, and the long established claims of hereditary absolutism. Whatever may be the denoument of this grand drama, it cannot fail to interest the physiologist, as well as the philanthropist, the vital statistician, as well as the statesman. The paleontologist who explores with enthusiasm the fossilized remains of former worlds, and is lost in amazement in contemplating the catastrophes by which entire races of animals and plants have been wholly lost, has for his study, a subject less curious and less interesting than the vital ethnologist of the present era.

New Orleans M. & S. J. 5:686 (May) 1849.

Present Concept and Control of the Staphylococcal Problem*

• Staphylococcal infections are ever present. The problem is basically an epidemiological one, a matter of spread in the hospital and in the community.

ELAINE L. UPDYKE, Sc.D.†
Atlanta, Ga.

The Problem

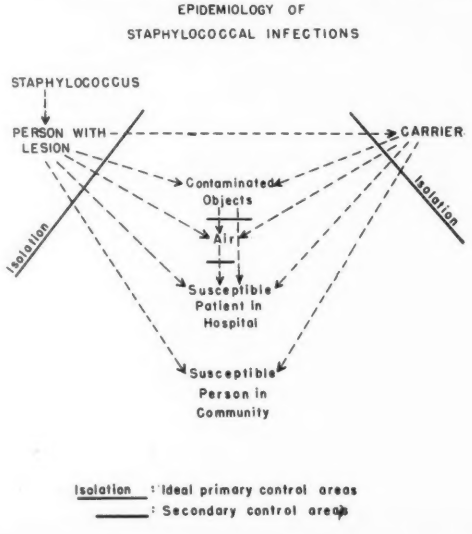
IN a discussion on staphylococcal diseases it is perhaps well to point out first that the problem is not new. Staphylococcal infections have been with us always. Until recent years, however, they were for the most part less obvious, if not less important, since they were often obscured by more serious infections (e.g. streptococcal) which are now controlled by the antibiotics. Furthermore, there are now many more susceptible individuals in our hospital and non-hospital populations, the susceptible individual being, in general, one whose natural defense mechanisms are lowered for one reason or another or are not fully developed. Some of the more common conditions which appear to predispose individuals to staphylococcal disease are:

1. Delivery: hazard to mother and newborn infant.
2. Severe viral infections such as influenza.
3. Diabetes.
4. Cystic fibrosis of pancreas.
5. Surgery: particularly long operations.
6. Lowered specific mechanisms of resistance; e.g. leukemia, agammaglobulinemia; agranulocytosis; irradiation sequelae.
7. Steroid therapy or prolonged heavy antibiotic therapy.
8. Old age.
9. Breaks in skin or mucous membrane such as occur in cut-downs, catheterization, burns, traumatic injuries, etc.

Such individuals compose the majority in whom staphylococcal problems occur whether they are in the hospital or at home. Usually their infections are acquired initially from other individuals, not from staphylococci they carried themselves. Therefore the staphylococcus problem is basically an epidemiologic one, i.e. a problem of spread in the hospital and community.

Epidemiology

A graphic representation of pathways of spread is given in Figure 1. The virulent staphylococcus usually is observed first in a person with a lesion, that person being either patient or ambulatory member of the hospital staff. The person



* Presented at the Seventy-ninth Annual Meeting of the Louisiana State Medical Society, May 6, 1959, in New Orleans.

From the Communicable Disease Center, Public Health Service U.S. Department of Health, Education, and Welfare, Chamblee, Georgia.

with a lesion passes the staphylococci to carriers; i.e. apparently healthy individuals who carry the organism in the respiratory tract, on the skin (especially the hands), around the umbilicus (especially in infants), in the feces, and in the perineal region where they apparently actively multiply.

Both the person with a lesion and some carriers contaminate objects such as dressings, ointments, thermometers, and tracheotomy, cystocopic and drainage tubes, etc. All three, i.e. patient with lesion, carrier and contaminated objects, may pass the organism to the air by droplets from the respiratory tract or moist dressings, or dust particles shaken from clothing, laundry and dry dressings.

The susceptible patient in the hospital is therefore exposed to at least four possible sources of infection: (1) Direct contact with patient or personnel with lesion; (2) direct contact with carrier; (3) direct contact with contaminated objects such as inadequately sterilized thermometers; and (4) bacterial laden droplets and dust in the air. The latter are apparently sometimes disseminated through improper engineering of heat conditioning systems, poor planning of laundry chutes and waste disposal systems, and poor housekeeping practices.

Finally both the carrier and the patient discharged from the hospital with a still draining lesion may pass the staphylococci to other members of their household and thence to the community at large.

General Approach to Control

This then is the problem. What is the solution? The solution is simple, really. All that needs to be done is to isolate both the persons with lesions and the carriers. If these two groups of individuals were isolated the primary lines of spread would be broken. (See Figure 1) The solution is simple—but not *easy*. It is not always easy to institute complete isolation of patients with lesions and of personnel with lesions whether porter or surgeon. It is even less easy to isolate carriers because it is necessary first to identify the carriers and then to differentiate the "dangerous" carrier from the casual carrier; since it is unlikely that the above "simple" solution can be made fully effective it is necessary to break the line of spread from other areas as well. Still it is not easy, because of the many possible objects, techniques, and engineering features which may contribute to dissemination of the organisms. However, in spite of the complexity of the problem much can be done to reduce the hazards.

A general approach to control may be outlined as follows:

A. Determining the problem; its existence and extent. This is the responsibility of the Hospital Infections Committee or an epidemiologist.

B. Observing surgical, medical, nursing, and housekeeping techniques.

C. Instituting specific control measures based on findings from the results of the observations, for example, patient isolation, removal from duty of personnel with lesions, improved sterilization of drainage tubes, improvement of housekeeping procedures, etc.

D. Developing an educational program for *all* personnel of the hospital from resident and staff doctors, nurses, administrative personnel, all the way through the hospital to the lowliest of the housekeeping staff.

E. Initiating pertinent bacteriologic surveys.

F. Establishing a surveillance system with an active, alert Hospital Infections Committee.

G. Developing research investigations if personnel, facilities and time permit.

Laboratory

In recent years, bacterial taxonomists have argued over the correct nomenclature for designating these organisms; argued to the confusion of the practicing bacteriologist as well as the physician. As of now the cumbersome term *Micrococcus pyogenes* var. *aureus* has been discarded and the older *Staphylococcus aureus* reinstated. However there is a difference between the new and the old *S.*

aureus. As used now it refers to *any coagulase positive* staphylococcus regardless of pigment production, thus eliminating the older terms "albus" and "citreus".

The importance of hemolysis and pigment production of staphylococci has been questioned for sometime since both are variable characteristics under the usual laboratory conditions. Hemolysis varies with the kind of blood and the base medium used. Pigment production depends on the medium, the age of the culture, the amount of growth (i.e. whether mass or single colony), temperature, etc. Therefore both hemolysis and pigment as commonly determined are poor criteria of the pathogenicity of staphylococcus organisms.

Many properties, toxins and metabolites of staphylococci have been identified and studied some of which are probably related to the virulence of the organisms. However, the laboratory tests for most of them are too difficult and complicated for routine use. Therefore we have come to rely on the coagulase test as a screening tool for identification of potential pathogens. It is in fact a very effective tool for two reasons: (1) Almost all highly pathogenic staphylococci are coagulase positive; and (2) the bacteriophages currently in use are effective almost exclusively on coagulase positive strains. On the other hand, of course, not all coagulase positive are highly pathogenic so it remains only a screening test.

The laboratory has a dual role in assistance with staphylococcal problems. The first role is help to the physician for treatment of the individual patient. This requires only isolation of the organism, a coagulase test and an antibiotic sensitivity test; all relatively simple laboratory procedures. It should be emphasized, however, that the validity of the laboratory results depends to a large degree on the care with which the specimen is taken. Since both coagulase positive and negative staphylococci are ubiquitous, a carelessly taken specimen may yield surface contaminants rather than the causative organism.

The second role of the laboratory in staphylococcus problems is assistance in control of outbreaks. This requires more detailed studies including bacteriophage typing. It should be emphasized that phage typing is a research and epidemiologic tool for assistance in control of outbreaks. In general the typing of sporadic cultures serves no useful purpose and is not recommended. Why does the typing of sporadic cultures serve no useful purpose?

In the first place the phage type, *per se* is not related to the pathogenicity of the staphylococcus organism. Although it is true that the 80/81 and variant strains are now very common in acute hospital problems it is also true that these strains are sometimes present in hospitals without causing serious trouble. Furthermore, and perhaps more important, strains of other phage types do cause trouble. In a recent review on epidemic staphylococci Williams [4] assembled data on published reports of 32 maternity unit outbreaks. The causative organisms of these outbreaks include 13 distinct phage types and several strains identified by other means.

In the second place, typing of sporadic cultures serves no purpose as a guide to therapy since phage type is not directly related to the antibiotic sensitivity pattern of a strain. The sensitivity test remains the most reliable therapeutic guide.

Therefore, phage typing is not recommended as a routine diagnostic tool. This is indeed fortunate since the procedure is too time consuming, the materials are too difficult to obtain, and the technical problems in performance and evaluation are too great for it to be a practicable test for the average hospital laboratory to perform. On the other hand, phage typing is available to most hospitals for epidemiologic control purpose through regional typing laboratories which are usually state health department laboratories. Typing laboratories often accept cultures only if they are definitely related to the control of an outbreak. It is necessary for the laboratory first to have several

cultures from infections in order to define the outbreak. When the "epidemic" strain for a given outbreak has been determined, phage type identification of strains isolated from personnel and environment aids in the epidemiologic evaluation and control of the outbreak.

Not infrequently a hospital is unaware that it has a staphylococcal problem because the active lesions develop only after the patients are discharged. The physician sees such patients in his office and may suspect that the infections are hospital-acquired but may find that the hospital is reluctant to acknowledge any responsibility. If the physician can demonstrate the same phage type from infections in several patients who have recently been discharged from one hospital he has strong suggestive evidence of a single source of infection. With that information he may be able to stimulate hospital investigations which first disclose the problem and then lead to its control. In such situations the phage typing laboratory will be glad to cooperate with the physician by typing "sporadic" cultures.

Acknowledgement is made to Dr. Andre J. Nahmias for access to some of his tabular material.

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Program Shows Hospitals Can Be Humanized

Hospitals can retain a human approach even though they have grown into one of the nation's largest industries.

A case in point was described by Dr. Howard J. Lockward of Manchester, Conn., in the Jan. 9 Journal of the American Medical Association.

Dr. Lockward said a new program of "progressive patient care" at the 300-bed Manchester Memorial Hospital allows the patient "to retain his individual dignity." The program was begun in 1957 when the hospital began to show signs of "growing pains."

"One of the main charges leveled at modern medicine is that we treat the disease instead of the patient," he said. "Progressive patient care has once again allowed us to go back to the patient as an entity and treat each person according to his medical needs."

"Philosophically, the program is patient-oriented. The patient is the raison d'etre of the hospital, therefore his total needs are considered.

"The doctor-patient relationship is the hub of patient care. All other services such as dietary, nursing, physiotherapy, and diagnostic procedures radiate from this center of activity as the spokes of a wheel."

The degree of illness, or the phase of the disease, is used as the basis for the new program rather than economic status or type of disease.

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The Journal does not hold itself responsible for statements made by any contributor.

Editorial

Possible Shortage of Physicians

A possible or probable shortage of physicians in the next fifteen years is giving concern. It is being considered by executives who have to do with medical education and with public health. Although the number of practicing physicians and medical students is rising slowly each year, the increase in population is proceeding at a faster rate than the anticipated rise in physicians. The reasons for this disproportion are to be found in many fields.

Although the total number of students applying for admission to medical schools is twice the number accepted, the proportion of properly qualified students is decreasing. The cost of tuition and the other items of medical education are increasing. The cost for the four years is now about twelve thousand dollars.

Fifty-two per cent of the students graduating are in debt, and one third have a debt of more than four thousand dollars. Some two thousand American students are seeking medical education in foreign medical schools, and some seven hundred and fifty graduates of foreign medical schools obtain licenses to practice in this country each year. Graduates of American medical schools, for the current year, will be about seven thousand one hundred and thirty-three. To increase this number progressively there would have to be an adequate supply of qualified applicants and of money for greatly expanded teaching facilities.

Since 1948, seventy-eight fully developed four year United States medical schools have spent one billion two hundred and thirty million, seven hundred and seventy four thousand dollars on improved facilities. They still need some three hundred million. If such funds were available and the construction completed by 1965, some eight hundred and fifty additional freshmen medical students could be accepted. New medical schools are built slowly, and at present, this would involve an estimated outlay of about fifty million dollars for each school, half of which would go into construction and equipment.

Funds for this type of expenditure are recruited slowly, either in the form of

taxes or endowment. Both are affected by the tax policy of the federal government, which is distorting values through inflation and drying up the sources of risk capital.

Accordingly, the prospect is that if pressing needs of existing medical schools can be met, there will probably be some eight thousand medical graduates a year in 1965, and these will probably be supplemented by some seven hundred and fifty foreign graduates.

The present ratio of physicians to population is variously calculated at about 132 per 100,000. Without any special social planning, it has been at approximately this proportion for about fifty years. It is estimated that at about 1975 our population will be two hundred and thirty-five million more or less. The ratio of physicians will decline to about 127 per 100,000. To consider this situation, the Surgeon General appointed a consultant group on medical education, consisting of twenty-two individuals experienced in related fields, ten of whom who were physicians and two of these were practicing. This Committee recommends that three thousand six hundred additional graduates be secured in the next fifteen years, which would bring the total per year up to eleven thousand. The majority of this increased number of physicians would have to come from additional medical schools. Increase in the number of students is to be assisted by federal scholarships and the increase in the number of schools by federal grants on a matching basis of about five hundred million, bringing the total up to one billion. This possibly would provide for twenty to twenty-two schools.

The maintenance of the new schools and the existing schools is to be provided by both public and private funds, the definite proportions not stated. Such a program—if matching funds could be secured, and this is doubtful—would provide by 1968 an additional three and a half thousand graduates. Whether these would be drawn from properly qualified applicants is open to question. It would, however, put the federal government directly into the support and ultimate control of medical education, regardless of what promises and plans might be made to the contrary. Any law, or administrative policy agreed upon could be displaced by a newly elected Congress or a freshly packed Supreme Court.

The risk of having the proportion of doctors drop from 132 to 127 per 100,000 does not justify the dangers of this type of federal government expansion. The natural law of supply and demand has been adequate to meet the needs thus far. Expected reduction will be less than five per cent of doctors, which would mean less than 5 per cent reduction of medical service, presumably.

Experience in World War II is a valuable guide. For about three years one third of the practicing physicians were withdrawn from the civilian population. While inconvenience was general, grave and serious injury to the health of the nation was not recognized. Another factor to be considered is that the increase in population is predominantly urban. Ninety-seven per cent of the growth between 1950 and 1955, was in cities of fifty thousand and over. This is just the area where most physicians are already. The ratio of physicians to population in the northeast is 160 to 100,000; in the south, it is 100. The mortality and morbidity is not 60 per cent greater in the south than it is in the northeast. Of eleven southern states, the ratio in Florida is 131, in Louisiana, 112, and in the remaining states varies from 74 to 103. This distribution is not new, and it has generally been attended with rising standards of practice in all areas. It is generally recognized and admitted that medical schools need more money. No general ever complained of having too many troops with which to enter battle. The plea to have the federal government enter the field of medicine to a greater extent than it has done already in the field of research would produce in a short time

a federal medical, all powerful bureau and would ultimately result in state medicine. The risk and prospect of this is unnecessary if the laws applying to demand were allowed to operate as in the past.

Southeastern Surgical Congress

The Southeastern Surgical Congress will hold its Twenty-eighth Annual Assembly in New Orleans, March 21-24, at the Roosevelt Hotel.

The program lists many interesting papers and panel discussions by distinguished surgeons, covering a wide selection of subjects. The material to be offered, although from the surgical standpoint, will be of interest to all.

ORGANIZATION SECTION

The Executive Committee dedicates this section to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.

An informed profession should be a wise one.

THE FORAND BILL

Critical Stage Nears in Forand Battle

According to a recent issue of the **Wall Street Journal**, proponents of the Forand Bill have gained considerable support in Congress to expand the Social Security system to include medical benefits and health care for those receiving Social Security payments. In addition, many Congressmen report they have been flooded with letters, resolutions, telegrams and telephone calls from supporters of the bill. These reports have come from legislators known to be against the bill as well as those favoring it.

The **Wall Street Journal** story also reported that some Southern Democrats and conservative Republicans are now leaning toward Forand-type legislation. With 1960 a presidential election year, these reports have special significance. Historically, Congress has increased and expanded Social Security benefits at election time.

It is believed the House Ways and Means Committee will hold hearings in early March on the entire Social Security system. In view of these alarming developments, the American Medical Association and the Louisiana State Medical Society are making an urgent appeal to all medical societies and individual physicians to make known to their Congressmen our opposition to legislation of this type.

What You Should Do

Every physician should send at least one letter to his Congressman. The letter should:

1. State your opposition to the Forand Bill.
2. Cite the reasons for your position.
3. Point out that care of the aged is a local problem to be met on the state level and that adequate medical care for the aged is provided in Louisiana under existing programs.
4. Request your Congressman to contact members of the House Ways and Means Committee and make known your views.

In addition to writing your Congressman, each doctor should ask as many (at least 10) nonmedical friends as possible to do the same. These letters should come from friends in all walks of life—small businessmen, clergymen, local government officials, bankers, farmers, state legislators, insurance men, and the like.

Your wife can make a tremendous contribution to this campaign by writing her Congressman and soliciting the support of her friends. It is impossible to have too many letters from too many people voicing opposition to the Forand Bill. Both you and your wife should seek resolutions from as many lay groups, civic clubs, and other organizations as possible opposing the Forand Bill.

Begin the Letter Campaign Now

Getting letters off to Congressmen cannot be started too early. Hearings are scheduled for early March and if the letters are to be effective, they should be in Washington by the sackful before the hearings begin. Proponents of the Forand Bill have already begun flooding Washington with letters. The time for your letters is now. Recent revisions of the labor laws

enacted at the last session of Congress should prove to any doubters the effectiveness of letters and the voice of the "people back home." In a showdown fight on a controversial issue, legislators' votes are cast with an ear to the grass roots.

Who and Where to Write

Letters to Congressmen should be addressed to the House Office Building, Washington, D. C. Your Senator's mail should go to the Senate Office Building.

About the Forand Bill

Enclosed in the February issue of **Capsules** was the pamphlet "The Forand Bill and What You Should Know About It." This pamphlet explains in very simple terms why the Forand Bill is bad medicine not only for doctors but for the entire population. Additional copies of this pamphlet may be had free upon request to the Louisiana State Medical Society.

The Job Can and Must Be Done

Without question, the Forand Bill is the most serious threat to the private practice of medicine since the infamous Wagner-Murray-Dingell Bill of the 1940's. The Forand Bill must be opposed with the same vigor and effort as the Wagner-Murray-Dingell Bill if the private practice of medicine is to be preserved.

It's Your Fight

The worst thing you can do is nothing. Don't wait for your colleagues to do your job for you. If this bill passes, it will be because doctors let it pass. This is your fight. Write, write often, write **NOW!** Be sure to send a copy of all letters and resolutions to Rep. Wilbur D. Mills, Chairman of the House Ways and Means Committee, House Office Building, Washington 25, D. C.

For fear that some of our doctors might not read "Capsules," and realizing its importance to every physician in the State, the above information is also published in the Journal.

MEMBERSHIP DUES

Your membership dues to the Louisiana State Medical Society and American Medical Association are due and payable at this time.

Unless, in an exempt classification, you should pay your local, state and national membership dues at this time to assure your continuous membership in these respective organizations without delinquency or interruption.

Separate checks for Parish, State and AMA dues should be mailed to the Secretary of your Parish Medical Society. Membership dues for District Societies should be mailed to the Secretary of the respective District Societies.

State dues are $50.00 and AMA dues are $25.00. Since Parish and District Society dues vary, the proper amount can be obtained from the Secretaries of these Societies.

If you desire to cover local, state and national dues in one check, make check jayable to the Secretary of your Parish Medical Society. Your Parish Secretary-Treasurer should forward State and AMA dues to the Secretary of the State Society and he, in turn, will forward AMA dues to Chicago.

Medical Defense does not cover any member who has not paid his or her annual dues prior to the rendering of services for which damages are claimed.

Members exempted from paying State or AMA dues or both for 1959 will be automatically continued on the 1960 membership roster of both organizations, provided there has been no change in status.

Membership in the Louisiana State Medical Society should appeal to every thoughtful physician licensed to practice in Louisiana.

We are publishing a brochure listing the many advantages and benefits provided by this membership which will be mailed to all members and eligible non-members in the very near future. We would respectfully request each member to exert his best efforts and influence in obtaining new members for both the State Society and the AMA.

Do you know that with only 70 more AMA members our Society will be entitled to an additional delegate to the American Medical Association, giving us 3 delegates instead of two? An additional delegate would materially increase our influence in the national organization and be of immense value to us. Why not help us in obtaining this increase in membership?

You cannot afford to be without a dues-paying membership in the AMA, since, at this time, this membership gives a year's subscription to the Journal of the AMA, The AMA News, Today's Health, and a year's subscription to anyone of the Specialty Journals of your choice published by the American Medical Association and listed below.

1. Archives of Internal Medicine
2. American Journal of Diseases of Children
3. Archives of Neurology & Psychiatry
4. Archives of Dermatology
5. Archives of Surgery
6. Archives of Otolaryngology
7. Archives of Pathology
8. Archives of Ophthalmology
9. Archives of Industrial Health

Won't you help us increase our membership?

MEDICAL NEWS SECTION

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
Ascension	Third Tuesday of every month	
Calcasieu	Fourth Tuesday every other month	Lake Charles
East Baton Rouge	Second Tuesday of every month	Baton Rouge
Lafayette	Second Tuesday of every month	Lafayette
Morehouse	Third Tuesday of every month	Bastrop
Natchitoches	Second Tuesday of every month	
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Tangipahoa	Second and fourth Thursdays of every month	Independence
Second District	Third Thursday of every month	
Shreveport	First Tuesday of every month	Shreveport
Vernon	First Thursday of every month	

THE SOUTHEASTERN SURGICAL CONGRESS

Twenty-Eighth Annual Assembly

The Southeastern Surgical Congress will hold its twenty-eighth annual assembly on March 21, 22, 23, 24, 1960, Roosevelt Hotel, New Orleans.

An informative program has been planned and in addition to the many talks by guest speakers, Panel Discussions will be held on Monday, "Acute Intestinal Obstruction," on Tuesday, "Forum on Progress in Surgery," and on Wednesday, "When Things Go Wrong in Surgery—What Shall One Do?"

A complete listing of speakers and their talks will be found on pages 12 and 13 of the advertising section in this issue.

Those wishing to attend are urged to make their hotel reservations as early as possible by writing directly to The Roosevelt Hotel.

For further information, please contact: Dr. B. T. Beasley, Secretary-Director General, The Southeastern Surgical Congress, 340 Boulevard, N. E., Atlanta 12, Georgia, or, Dr. Howard Mahorner, General Chairman, Mahorner Clinic, 2030 St. Charles Avenue, New Orleans, Louisiana.

ANNUAL MEETING WEST VIRGINIA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

The West Virginia Academy of Ophthalmology and Otolaryngology will hold its annual meeting at the Greenbrier Hotel, White Sulphur Springs, West Virginia from April 10-12, 1960.

Among the guest speakers will be:

Dr. Harold G. Scheie, Professor of Ophthalmology, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania.

Dr. Charles E. Iliff, Associate Professor of Ophthalmology, John Hopkins University School of Medicine, Baltimore, Maryland.

Dr. Oscar T. Becker, Clinical Professor of Otolaryngology, University of Illinois, Chicago, Illinois.

For any additional information, please contact the secretary, Dr. Albert C. Esposito, First Huntington National Bank Building, Huntington 1, West Virginia.

COURSE IN ANESTHESIOLOGY

The University of Texas Postgraduate School of Medicine announces the **Fifth Annual Course in Anesthesiology** to be held March 9, 10 and 11, 1960, in Houston, Texas.

The Course is designed to review theory and practice of commonly used anesthetic techniques and will include discussions of some of the newer drugs. Lecturers include:

Charles R. Allen, M. D.; James E. Armstrong, Jr., D.D.S.; Raymond F. Courtin, M. D.; William S. Derrick, M. D.; Richard C. Hay, M. D.; Emilia A. Hoeflich, M. D.; James Irvine, Jr., M. D.; Arthur S. Keats, M. D.; Kenneth K. Keown, M. D.; C. L. LaGrone, M. D.; Walter H. Mannheimer, M. D.; John W. Matthews, M. D.; Ray T. Parmley, M. D.; Eugene L. Slataper, M. D.; Stewart A. Wilber, M. D.

Please address all inquiries to: The University of Texas, Postgraduate School of Medicine, 410 Jesse Jones Library Building, Texas Medical Center, Houston 25, Texas.

POSTGRADUATE COURSE ON DISEASES OF THE CHEST

The Council on Postgraduate Medical Education of the American College of Chest Physicians will present the 13th Annual Postgraduate Course on Diseases of the Chest at the Sheraton Hotel, Philadelphia, March 14-18, 1960.

The most recent advances in the diagnosis and treatment of heart and lung diseases, medical and surgical aspects, will be presented.

Tuition for this five-day course will be $100, including round-table luncheon discussions.

Further information may be obtained by writ-

ing to the Executive Director, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

NEW OFFICERS

At the meeting of the Southern Medical Association in Atlanta, Georgia on November 15th-19th, 1959, the following officers were elected for the Section of Ophthalmology and Otolaryngology for 1960:

Chairman, Dr. George M. Haik, Professor and Head of the Department of Ophthalmology at Louisiana State University School of Medicine, 812 Maison Blanche Building, New Orleans 16, Louisiana.

Chairman-elect, Dr. Mercer G. Lynch, Assistant Professor of Otolaryngology, Tulane University School of Medicine, 3503 Prytania Street, New Orleans 15, Louisiana.

Vice-Chairman, Dr. Bernard J. McMahon, Director of the Department and Clinical Professor of Otolaryngology, St. Louis University School of Medicine, 8230 Forsythe Blvd., Clayton 24, Mo.

Secretary, Dr. Albert C. Esposito, First Huntington National National Bank Building, Huntington, West Virginia. Formerly instructor of Ophthalmology, Ohio State University College of Medicine, Columbus, Ohio.

The next meeting of the Section will be held in St. Louis, Missouri, from October 31st to November 3rd, 1960. Those interested in participating should write to the Secretary of the Section, Dr. Albert C. Esposito.

FORTHCOMING MEDICAL MEETINGS

Mid-South Postgraduate Medical Assembly
February 9, 10, 11, 12, 1960
Peabody Hotel, Memphis, Tennessee

—

Southern Trudeau Society
(and the Southern Tuberculosis Conference)
September 14, 15, and 16, 1960
Hotel Francis Marion, Charleston, S. C.

—

American College of Surgeons
46th Annual Clinical Congress
October 10-14, 1960
San Francisco, California

NEWEST ORAL DIABETIC DRUG IS "CLEARLY" USEFUL

DBI, the newest oral diabetic drug, is clearly of value in the treatment of all types of diabetes, Dr. Julius Pomeranze, New York, said recently.

Dr. Pomeranze, who conducted the first clinical tests of the drug, made his comment in the Sept. 19 Journal of the American Medical Association. He reported the results obtained in 206 diabetics given the drug for periods up to two years.

DBI, or phenethylbiguanide, is one of a group of drugs known as biguanides. It differs in action from other anti-diabetic drugs taken by mouth, which are sulfonylureas.

Dr. Pomeranze said, "The ultimate place of DBI in the management of diabetes will be determined after much more prolonged and widespread observation."

However, when it is used carefully, adjusting the drug to the patient's needs rather than attempting to fit patients into a rigid dosage pattern, it permits the cessation of insulin therapy in a significant percentage of diabetic patients and is useful, together with insulin, for better control of many of the patients with more severe cases.

The study showed that DBI could be used alone or with a reduced amount of insulin in 62 per cent of the patients regardless of the type of diabetes. The use of other oral drugs is limited to mild or stable cases of diabetes, since they are ineffective against juvenile or "brittle" diabetes.

DBI allowed some patients with mild diabetes to stop using insulin altogether and some with more severe cases to cut the amount of insulin used.

Diabetes occurs when the pancreas fails to secrete enough naturally-occurring insulin to burn up all the sugar taken in by the body. Then artificial insulin is necessary. The oral drugs do not replace insulin, but apparently help the body to better use what insulin it has.

Dr. Pomeranze said the sole limitation to the broader use of DBI appears to be its gastrointestinal side-effects. Twenty-six per cent of the patients treated had to stop the drug because of gastrointestinal side-effects. It seems that these are "inherent in the drug when proper individual dose is exceeded," Dr. Pomeranze said, but they may serve as a useful dose regulator and perhaps as a safety device.

Cooperating with Dr. Pomeranze in the study were Drs. George T. Mouratoff, Raymond J. Gadek, and Edward J. King. They are all associated with the New York Medical College-Metropolitan Medical Center Bird S. Coler Memorial Home and Hospital.

INTERNATIONAL ACADEMY OF PROCTOLOGY 1959-1960 AWARD CONTEST

The International Academy of Proctology announces its Annual Cash Prize and Certificate of Merit Award Contest for 1959-1960. The best unpublished contribution on proctology or allied subjects will be awarded $100.00 and a Certificate of Merit. The winning contribution will be selected by a Board of impartial judges, and all decisions are final.

The formal award of the First Prize, and presentation of other Certificates, will be made at the Annual Convention Dinner Dance of the

International Academy of Proctology, April 27th, 1960, at the American Hotel, Miami Beach, Florida.

The International Academy of Proctology reserves the exclusive right to publish all contributions in its official publication, "The American Journal of Proctology". All entries are limited to 5,000 words, must be typewritten in English, and submitted in five copies. All entries must be received no later than the first day of February, 1960. Entries should be addressed to:

ALFRED J. CANTOR, M.D.
Executive Officer
International Academy of Proctology
147-41 Sanford Avenue
Flushing 55, New York

RARE CASES OF HALLUCINATIONS REPORTED IN A.M.A. ARCHIVES

When one person has a hallucination, it is interesting, but not unusual. When three persons—members of the same family— have similar ones, it is rare and medicine takes notice.

The cases of two families, each with three members who had similar hallucinations, are reported by Dr. N. Lukianowicz, Barrow Hospital, Bristol, England, in the September 1959 Archives of General Psychiatry, published by the American Medical Association.

Family A. consisted of a brother and two sisters. The brother and one sister lived together, while their married sister lived down the street. Their mother died at age 72 after long suffering from an inoperable cancer and senile dementia.

Shortly after the mother's death, all three children began "seeing" their mother just before they fell asleep. The brother said, "Since my mother died, her apparition comes usually twice a week through the closed door of my bedroom and stops at the foot of my bed. She stands there for a while and stares at me." A sister said, "She would come in, right through the panels of the door, and then would stop at my bed and gaze."

They also reported "hearing" their mother call them by name during the day.

Their hallucinations continued until the brother entered a hospital for surgery.

Family B. consisted of a father, mother and daughter. They too experienced similar hallucinations, although they also had individual ones. Father and mother were once awakened by a knocking at their bedroom door when no one was there. The mother told of waking and "seeing" her husband sitting at the foot of the bed with his head in his hands. She asked if he were ill and then realized that he wasn't there at all, but was sleeping beside her. The daughter had daytime auditory hallucinations.

The father suffered recurrent hallucinations during the daytime. He "felt" someone's hand resting on his shoulder. He explained, "I knew at once who it was. It was my father, for he always liked to put his hand on my shoulder when talking earnestly to me. I turned around, but there was no one there."

After the second such experience, he and his wife decided it was "a delayed shock" after his father's sudden death and that he must be "imagining things."

The hallucinations ended after Mr. B. underwent psychotherapy.

Dr. Lukianowicz explained that most of these experiences were connected with sleep—either occurring just before going to sleep or just after awakening. However, those that occurred during the day were probably "ordinary" or "genuine" hallucinations, similar to those occurring in psychotic states or during infections and illnesses.

In both families, the central theme of the phenomena was the figure of a deceased parent, for whose death their respective children held themselves responsible. It is assumed, Dr. Lukianowicz said that, these experiences were precipitated by fear and an anxious expectation of punishment.

Mr. B. hated his father, the doctor said, and entertained death wishes against him. When the old man suddenly died, Mr. B. held himself responsible and expected punishment, probably from the hand of his deceased father. The hallucinated "hand" resting on his shoulder may symbolize the warning of the approaching revenge or it may be a sort of conditioned reflex, since the father had rested his hand on Mr. B.'s shoulder when disciplining him.

Family A.'s strikingly similar and uniform hallucinations are not surprising, since, being siblings, they represent a more homogeneous group than Family B., Dr. Lukianowicz said.

The causative factors of the A.'s hallucinations may be similar to those of Mr. B.'s. Old Mrs. A., apart from being physically very sick, was also suffering from a mental illness, and must have been exteremely trying at times. Hence her children could not help developing some death wishes, which might even have had a certain "moral justification," the author said. She was obviously suffering and they only wished that the death might bring "a deliverance" to her from her misery. Nevertheless, when she died, they all felt guilty and responsible.

Thus the image of their dead mother became the kernel of their secret fears and the menacing content of their imagery. The hallucinations occurring before sleep might even be called "real nightmares." Mr. A.'s hallucinations disappeared after his surgery, perhaps because he felt the surgery to be a form of punishment.

UNIVERSAL IMMUNIZATION AGAINST LOCKJAW URGED

Universal immunization against tetanus, or lockjaw, was recommended recently by a researcher at Walter Reed Army Institute of Research.

In a report prepared for the American Medical Association's Council on Drugs, Dr. Geoffrey Edsall said, "Since all human beings are subject to some chance of contracting tetanus, all people should, ideally, be immunized with toxoid."

The "ubiquity in nature" of the tetanus bacillus is not always fully recognized, he said. It is present everywhere and every wound offers a chance for infection with the disease.

However, adequate immunization against tetanus may be achieved with a variety of separate or combined preparations. Tetanus toxoid (made from the bacillus and injected into the human, where it causes the body to develop defenses against the disease) is one of the most effective and safest immunizing agents known, Dr. Edsall said.

This was proved by experience in World War II, he continued. The tetanus rate of the U. S. Army, which in World War I was approximately 13 per 100,000 injuries, fell to the "incredibly low level" of 0.44 per 100,000 injuries (12 cases in over 2,500,000 injuries).

Basic immunization requires an initial injection of toxoid followed by a reinforcing dose 6 to 12 months later. Immunity, once established by adequate basic immunization, should be maintained by periodic booster shots at intervals of four or five years, he said.

Universal immunization would prevent practically all cases of tetanus which might otherwise follow trivial or unrecognized wounds. Recognized wounds must be treated individually; the most important procedure in handling tetanus-prone injuries, regardless of immunization, is adequate cleaning of the wound, he said.

While universal immunization is desirable, it probably cannot be readily achieved in the immediate future, Dr. Edsall said. Therefore, he recommended that attention be focused on those groups in whom tetanus immunization is especially indicated. They include:

—Persons, such as farmers, hunters, or operators of heavy machinery, who are subject to an apparently greater than average risk of tetanus-prone injuries.

—Military persons.

—Allergic individuals or those who are sensitive to horse serum preparations. Tetanus antitoxin, the rapidly acting substance which produces a temporary passive immunity to the disease, is made from horse serum.

—Groups readily reached en masse through child health programs or industrial health programs.

Dr. Edsall's report appears in the Sept. 26 A.M.A. Journal.

PERSONS OVER 40 NEED GLAUCOMA EXAMINATIONS

Examination for glaucoma, which may lead to blindness, should be an "indispensable" part of all physical examinations of persons over 40 years, five Memphis doctors said recently.

Persons with chronic diseases, such as hardening of the arteries, high blood pressure or arthritis, especially should be examined for the disease, the doctors said in the Oct 24 Journal of the American Medical Association.

In glaucoma, which is most prevalent in persons past 40 years of age, tension within the eyeball is increased. The structure contains fluid that keeps the orb from collapsing. The fluid enters through openings in one part of the eye and escapes from others. Glaucoma occurs when the outflow is blocked and the excess fluid builds up pressure in the eyeball and damages the nerve cells.

It can be treated and blindness prevented if the disease is discovered early enough. A simple test, tonometry, can show the presence of glaucoma.

The doctors reported a study of 13,155 persons in hospital and nonhospital groups during a two-year period. Tonometer testing revealed 271 cases of subclinical glaucoma not under treatment. During the same period 62 persons who visited the ophthalmology clinic at the teaching hospital of the University of Tennessee College of Medicine were found to have the disease.

The highest rate of glaucoma was found in residents of a home for the aged, where 6.4 per cent of those examined had the disease. The next highest rate (3.4 per cent) was in Negro women visiting outpatient clinics and in Negro males engaged in occupations involving considerable manual labor (3.1 per cent).

The lowest rate was in white women who engaged in occupations requiring "discriminatory visual activity," such as teaching or department store clerking, the doctors said. Their low rate may result from the fact that they have frequent eye examinations and glaucoma is discovered early.

In general the study produced three conclusions: glaucoma occurs more frequently as age increases; it occurs more frequently in Negroes than in white persons, and there seems to be an association between the disease and other chronic diseases, such as arthritis or high blood pressure.

The authors are Drs. Henry Packer, Alice R. Deutsch, Philip M. Lewis, Claude D. Oglesby, and A. C. Cheij.

BOOK REVIEWS

Medical Department, United States Army, Surgery in World War II. Cold Injury, Ground Type. Washington, D. C., Government Printing Office, 1958, Pp. 570.

Cold Injury, Ground Type, one of the volumes comprising the official history of the medical department of the United States Army in World War II, is a classic work on cold injury which is of value far beyond its place in this historical series.

In the first two chapters the epidemiology and the types of cold injury are considered. Here the problem is outlined as it affects the individual soldier on the one hand and an army of many soldiers on the other.

The historical section is devoted to a review of the role of cold injury in wars of the past two centuries. This is one of the most interesting chapters in the book and serves to put the subject in its proper perspective.

In the remaining chapters the experiences of the United States Army with cold injury in World War II are presented. As a medical officer with an infantry division in Italy this reviewer found much in this section that was familiar. The first formal mention of cold injury in the Office of the Surgeon General was contained in a note dated May 12, 1942. This note simply called attention to the fact that U. S. troops were operating in Arctic regions and that studies on health and sanitation in a cold environment should be instituted. It was almost a year before the problem was mentioned again, but there was still a failure to appreciate the importance of prevention. In August 1943, a memorandum was addressed to the Office of the Surgeon General pointing out that measures currently recommended for the control of cold injury were completely inadequate. It was also recommended that publications concerning cold injuries be corrected and brought up to date. In the fall of 1943, reports of trench foot began to come in from units in Italy and the problem rapidly assumed serious proportions. Although the military significance of this type of injury was apparent, it was evident from the reports that the importance of preventive measures was not sufficiently understood. By March 1944, preventive measures and management of cold injuries were thoroughly outlined and it was emphasized that implementation of these programs was a measure of discipline and the responsibility of unit commanders. War Department Technical Bulletin, dated August 4, 1944, covered all phases of cold injury and emphasized the value of prophylactic measures as a result of experiences gained in the Italian campaign.

In spite of this, however, a serious outbreak of cold injury occurred in the European theater of operations during the winter of 1944. In November 1944, approximately 11,000 cases of trench foot were reported in the European theater, an incidence greater than that reported for January and February 1944 in the U.S. fifth army in Italy. Thus it appeared that the lesson of the Italian campaign "was not heeded in the European theater of operations, or appreciation of its significance came too late." Control measures during the winter of 1944-45 were intensified but the tactical situation and the weather hampered their implementation. In March 1945, it was estimated that 45,000 predominately front line troops had developed some type of cold injury in the European theater and 30 per cent of these would require evacuation to the zone of interior. This failure to prevent cold injury among combat troops was discussed in the annual report of the Surgical Consultants Division to the Surgeon General for the year ending June 30, 1945, with the following conclusion: "Training troops on a subject of this type after they are engaged in intensive combat is less effective than training them during a period prior to such action. The main concern of men engaged in combat is the preservation of their lives. Attempts to teach men under such conditions measures for preventing trench foot, which to them is seemingly unimportant at the moment, are not likely to meet with any great degree of success."

The remainder of the book is devoted to a detailed review of the experience with cold injury in the various theaters of operation, and with a clinical consideration of cold injury. The pathogenesis, pathology, clinical manifestations, therapy and epidemiology of cold injury are thoroughly discussed. The final chapter is devoted to an analysis of the failure to cope successfully with cold injury in World War II. That the causes for the failure were finally appreciated and remedial steps taken was indicated by the program of prevention and control which was planned for the invasion of Japan and it appeared that the "sign post of Attu, the Mediterranean theater and the European theater had at last been read and heeded." It was finally realized that the combat soldier is as ineffective when evacuated from the front because of cold injury as he is when he is sent to the rear with a combat wound. It was also realized that instruction of the soldier in the proper use of clothing and winter equipment is just as important as training in the use of his rifle to protect himself in combat.

From a military standpoint this volume on cold injury is invaluable as a historical document and also as a reference for future military operations. In addition, it represents a definitive work on the ground types of cold injury and should be read by everyone interested in this problem.

OSCAR CREECH, JR., M. D.

The Relation of Psychiatry to Pharmacology; by Abraham Wikler, M. D., Baltimore, Maryland. Pub. for the American Society for Pharmacology and Experimental Therapeutics by Williams and Wilkins Co., 1957, pp. 322, Price $4.00.

This manuscript is written in Dr. Wikler's typically lucid style. The author has undertaken a comprehensive study of most of the compounds used in this field, and considered them from a variety of scientific disciplines. Although the references are not exhaustive, they do, in fact, include most of the more important contributions to this field up to the time of publication. The index is complete and simple to use with adequate cross references.

This book is a necessary addition to the reference library of persons interested in pharmacology and psychiatry. Furthermore, because so many of the compounds mentioned are used daily in general practice, it would also be of considerable value to the general practitioner.

WILLIAM A. KRIVOY, PH.D.

Surgeons All; by Harvey Graham, M. D., New York, Philosophical Library 1957, pp. 459. Price $10.00.

This eminently readable history of surgery was first published in 1939, and a "postscript" has been added to the recent edition. The story begins with the trepanning of skulls in the caves of prehistoric man, and it ends with a glimpse into the near future. In between, the author discusses the high place of surgery in Greece and Egypt, the depths to which it descended during the Middle Ages, and the general emergence of surgery as a respectable segment of the medical community. Of particular interest is the story of the separation of surgeons from the guilds of barber-surgeons in the late Middle Ages.

The author's method is largely biographical and the entire story is told with urbane humor. The style is erudite but not ponderous. The book is highly recommended, particularly for surgeons, who will find it a pleasurable excursion into the rather strange origins of modern surgery.

KEITH REEMTSMA, M. D.

An Atlas of Normal Radiographic Anatomy. R. Meschan. 2nd Edition. Philadelphia, W. B. Saunders Co., 1959. pp. 759, $16.00.

In the second edition of this very useful text the additions include chapters on radiation protection, bone growth and development, and there has been amplification of the portions on the brain, spine, and cardiovascular systems. Several of the prints from the previous book have been replaced by LogEtronic prints which improve the detail.

The combination of showing the patient in position, the resulting radiograph, and the diagrammatic sketch with the anatomic features labeled forms a very effective teaching mechanism. This book is highly recommended as a reference book for medical students and probably should be studied as a basic text for beginning residents in radiology. Other physicians might well use it as a reference work especially when referring to questions that might involve radiographic anatomy in the various systems of the body demonstrated in various positions.

CHARLES M. NICE, JR., M. D.

Roentgen Diagnosis of Abdominal Tumors in Childhood; by Charles M. Nice, Jr., M. D., Alexander R. Margulis, M. D., and Leo G. Rigler, M. D., Springfield, Illinois, Charles C Thomas, Pp. 75, with 52 illustrations, $4.00.

This excellent little monograph presents the approach and practices of the Department of Radiology at the University of Minnesota Medical School. Reliance is placed principally upon conventional x-ray diagnostic procedures available everywhere; these can be modified as the problem demands so as to accurately localize the mass insofar as possible. In this respect, the importance of lateral projections on plain films, as well as on the usual contrast examinations, is justifiably stressed and a goodly number of cases depicting their value are presented. Also of importance is the character of the mass itself with respect to its size, contour, presence or absence of calcifications, et cetera.

The authors (and rightly so) consider that special studies such as planigraphy, aortography and presacral carbon dioxide insufflation are sometimes of value, but in the great majority of cases are not essential in arriving at a correct diagnosis. The illustrations are ample in number and of good quality.

ROBYN HARDY, JR., M. D.

Hearing. A Handbook for Laymen; by Norton Canfield, M. D. Garden City, Doubleday & Company, Inc., 1959. pp. 214. Price $3.50.

This handbook on hearing, written for the layman by Norton Canfield, is full of factual information on a variety of subjects connected with impairment or total loss of the auditory function, including the causes of the impairment; techniques of diagnosis; medical and surgical techniques of correction for the types of impairment in which those methods are feasible; and techniques of rehabilitation for persons for whom medical or surgical therapy is not indicated and would be useless.

The importance of the patient's own recognition of his impairment is fully discussed. The sound advice is given—more easily than accepted—that he should obtain an evaluation of his status from an expert in the field, face the facts, and follow the recommendations he is given for

treatment or rehabilitation. More emphasis might perhaps have been put on the indisputable fact that in many cases, rehabilitation is the only feasible mode of management.

The importance of early diagnosis is stressed. The abbreviated case reports in the first chapter make clear that this is a problem which affects all ages, from infancy to the other extreme of life, in which dwell so-called senior citizens, a euphemism particularly regrettable in a generally plain-spoken text. There is sound advice on the early recognition and prompt treatment, by every practical method, of impaired hearing in children. Greater emphasis might have been placed on the dangers of the current tendency to treat acute middle ear infections by antibiotics alone, a practice which has been the cause of an appalling amount of deafness in young children.

As the late Dr. Walter Hughson pointed out, the psychologic implications of deafness are more important than those of any physical impairment. This is repeatedly noted in this book, which covers the emotional as well as the physical needs of the individual who has been sustained a hearing loss. There is also an excellent and helpful chapter on the acceptance of the patient's disability by his family and friends, with some useful suggestions on how they can help to alleviate his difficulties.

One wishes that a more detailed account had been given of the fine work accomplished at the Army aural rehabilitation centers in World War II, through which 9,500 deafened and hard-of-hearing patients passed in the three years of their operation. The results accomplished, often on unpromising material, might well serve as an inspiration to others similarly afflicted.

One also regrets that there is no index. The ommission of such an essential tool reduces the usefulness of any volume, as this reviewer can testify when he found it necessary to refer back to particular items in this book. The detailed chapter headings are not a satisfactory substitute.

Since, as the author states, the terms anacousis, hypacousis and dysacousis are not used in this book, it is a pity that they were dragged into the introduction. The nomenclature "now being established by the authorities" does not conform with established definitions and there seems little need or warrant for it.

The author has had a long experience in this field, and his presentation is generally sympathetic and sensible. This is a book which has long been needed. It would be well for all otologists to read it themselves and to recommend it to their patients. Most of them would benefit by the guidance it offers.

J. W. McLAURIN, M. D.

Allergy in Pediatric Practice; by William B. Sherman, M. D. and Walter R. Kessler, M. D., St. Louis, Missouri, C. V. Mosby Company, 1957, pp. 296, price $9.25.

This book reflects the well thought out position of two specialists, one in allergy, one in pediatrics, having the child as the focal point of interest. The result is an excellent presentation of an important subject, written without excess verbiage but yet in a comprehensive fashion. It will find its greatest usefulness perhaps in the hands of general practitioners and those pediatricians without special training in allergy.

VINCENT J. DERBES, M. D.

Milestones in Modern Surgery; by Alfred Hurwitz, M. D. and George A. Degenshein, M. D., New York, Hoeber-Harper, 1958, pp. 520, Price $15.00.

This beautifully prepared anthology is a tribute to the editors who selected and arranged the contents, as well as to the publishers who presented it in such an attractive manner. Many of the truly great contributions to modern surgery, together with a brief introductory biography of the physician who made the contributions, are reproduced. In Dr. Dunphy's "Foreword" to the book he pointed out that " . . . there may be a few who will disagree with the authors' choice of particular articles as milestones . . . " This is undoubtedly true as one's concept of the importance of contributions to medicine are naturally influenced by his professional background and his particular interests in surgery. The selections included in this book are certainly among the outstanding achievements in modern surgery and I believe represent as fair a selection of works of this type as one would expect to be compiled in a single book.

JOHN BLALOCK, M. D.

PUBLICATIONS RECEIVED

Julian Messner, Inc., N. Y.: Smoking and Health, by Alton Ochsner, M. D.

Grune & Stratton, Inc., New York: Antithrombotic Therapy, by Paul W. Boyles, M. D.

Philosophical Library, Inc., New York: Medieval and Renaissance Medicine, by Benjamin L. Gordon, M. D.; The Story of Dissection, by Jack Kevorkian.

U. S. Army Medical Service, Office of the Surgeon General, Wash.: Tabulating Equipment and Army Medical Statistics, by Brig. Gen. Albert G. Love, Col. Eugene L. Hamilton, and Ida Levin Hellman, M. Sc.

Vantage Press, Inc., N. Y.: Doctor Strand, by Boris Sokoloff; A Practical Guide to General Surgical Management, by Julian A. Sterling, M. D.; A Doctor Enjoys Sherlock Holmes, by Edward J. Van Liere, M. D.